EXHIBIT 22

UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF NORTH CAROLINA
SOUTHERN DIVISION

LAURA J. JONES, Plaintiff,	)	
vs.	)	CASE NO. 7:09-CV-106-BO
UNITED STATES OF AMERICA, Defendant.	)	

* * *

Deposition of
MORRIS L. MASLIA P.E., D.WRE, DEE

June 30, 2010
9:18 a.m.

Centers for Disease Control and Prevention
1600 Clifton Road, N.E.
Atlanta, Georgia

By Amy L. Dunning, CCR B-2079

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I N D E X T O E X A M I N A T I O N S

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MORRIS L. MASLIA, P.E., D.WRE, DEE,
having been first duly sworn, testified as follows:

EXAMINATION

BY MR. ANDERSON:

Q State your full name, please, for the record, sir.

A Full name is -- first name is Morris, M-o-r-r-i-s; middle name, Lavi, L-a-v-i; and last name is Maslia, M-a-s-l-i-a.

Q And what is your residence address, sir?

A 2681 Canna, C-a-n-n-a, Ridge Circle, Atlanta, Georgia 30345.

Q All right. Thank you. Have you had your deposition taken previously?

A No.

Q Okay. The first time.

A First time.

Q Let me just tell you -- I'm sure you've been advised of this by counsel, but from my perspective, it's very important that you and I communicate effectively here today and that we take care to listen to each other so we're sure we have precision in both the questions and the answers. Will you work with me to try to accomplish that?

A Yes, sir.

Q If I ask you a question and you don't understand it, just let me know, and I'll try to restate it someway to make sure we're communicating. Okay?

A Okay.

Q Because I think it's in the interest of everyone that we have a clear record.

A Okay.

Q If you need to take a break or anything like that, just let us know. This is not an endurance contest. I'm not here to try to be hard on Morris Maslia.

What, if any, preparation have you had for talking with me today?

A I met yesterday for about two hours with Mr. Bain and just went over the rules of the deposition, just as you explained them with that, and basically was told to answer as technically correct or with my knowledge that I have.

Q And obviously truthfully.

A Yes, yes.

Q You're aware this is a case in federal court, are you?

A I have not been told the specifics of the case. I have just been told that there's litigation

involved.

Q Okay. Well, it is a case in federal court. And under the rules of federal court, although you're certainly entitled to preparation and breaks and so forth, once the deposition begins, it's improper to talk about the answers and questions that I pose with your lawyer, with the exception of very limited privilege-related issues.

You realize obviously you're under oath.

A Yes, sir.

Q And you realize that the penalties of perjury would apply to your testimony here today.

A Yes, sir.

Q Okay. Fair enough. Tell me a little bit --

A Can I just make sure my cell phone is on vibrate?

Q Oh, yeah. In fact --

A I apologize, but --

Q Let's all do that.

I'd like to talk with you for a few minutes at the beginning here about your background.

A Okay.

Q Tell me a little bit about your education, if you would, sir.

A Got a bachelor's degree in civil

engineering -- it's actually a BCE -- from the Georgia Institute of Technology. I was awarded that in March of 1976. I have a Master's of Science in civil engineering from the same institute, that was awarded in March of 1980. I have subsequent courses towards a doctorate in civil engineering. I do not have a doctorate of any kind, but I -- course work towards that.

Q Okay. Any other education or particular training that would be relevant to the work that you did here?

A Well, in terms of -- basically worked for the U.S. Geological Survey, developing groundwater -- they transport models and applying them.

Q How long were you with them?

A I was with them for a little over nine years. Began in 1980 and then left the U.S. Geological Survey in -- I think it was November of 1989. And then I worked with a consulting firm, Geosyntech Consulting Engineers, for a couple of years, establishing their water resources department. I was the manager of the water resources department there, bringing online codes and things of that nature.

And then in January of 1992, I accepted a

position over at the Agency for Toxic Substances and Disease Registry as an environmental engineer. And I then developed and was one of the principal coauthors of the agency's exposure to Dose Reconstruction Program. And I have since been classified as a research environmental engineer under the Research Grade Evaluation program that runs throughout the civil service or the government.

Q What was your role when you were at the U.S. Geological Survey those nine years? What did you do?

A There were a couple of things. I worked on some studies in Southwest Georgia looking at the impacts of agricultural pumping. Southwest Georgia, at the time in the early eighties, was one of the last untapped resources for groundwater for large-scale irrigation practices, and there was an interest as to see what the impact that would have, and, of course, fertilizers and things like that. I also worked on the USGS's regional aquifer system analysis programs, which Congress had mandated them to do in the late seventies and throughout the eighties. And I worked on the Florida aquifer, which is basically Southwest Georgia and Northwest Florida.

And at the same time, I became involved with

a case just because of the modeling ability that I had, or specialized modeling ability, in a case to assist USEPA up at Love Canal in Hyde Park, New York. That was the precursor of Superfund, and they used part of our analysis to, in fact, promulgate Superfund.

Q So your analytical techniques and methodologies in that instance became part of the basis for the Superfund system?

A I would not go that far. I would say that the modeling that we did -- that we did because of the area that it was located in -- it was Love Canal in Hyde Park area in New York -- was the impetus for Congress passing Superfund legislation. So we were a technical consultant to EPA.

Q In connection with the passage of Superfund.

A No. It was in connection with a lawsuit. From what I understand, we were being sued by the Canadians because of supposed contaminated water coming over Niagara Falls, because it's a fractured dome right there and Hooker Chemical Company had some waste there. And so the U.S. was being sued by the Canadians, or a group within Canada. And so a colleague of mine was requested to provide testimony in a court hearing.

And one of the things that came out of that is that he suggested in 1980 that we could use computer methods to answer some questions rather than speculating based on limited field data. So that's when he brought me in, and we did a computer model of the area.

Q You must have been using big-box hardware like AS/400s and things like that.

A No. Actually we were renting computer time. At that time you used to have to rent computer time.

Q I remember, yeah. I was at Berkeley at that point.

Mike wants me to ask you about your business card, and I should have done that. It says here "PE." Could you just tell me what that is.

A Sure. PE is a professional engineer, and I'm registered and current in the state of Georgia as a professional engineer and have been for a number of years. And then the DEE means I'm a diplomat of the American Academy of Environmental Engineers. And then does it say "D.WRE" on there? Yes. Okay. And that's a diplomat of the water resources -- I forget the exact title. But there's the Academy -- American Academy of Environmental Engineers. And then there's the American Society of Civil Engineers, and that's

their equivalent diplomat designation.
Q And what does it mean to be a diplomat?
A Basically you can -- it's based on the number of years of experience you have in a certain specialty area. And then they can -- depending on the organization, they can put you in front of a panel to answer specific questions to test your knowledge.
Q Have you been through those processes?
A Yes.
Q And you passed?
A Yeah. That's what they tell me. Yes, I have.
Q How long have you been a licensed professional engineer here in the state of Georgia.
A I'm trying to think. Let's see now. I graduated in 1980, I believe, because you had to have four years of practice with a master's degree. So I believe it was 1980. You can probably go through the Secretary of State's office and pull it up online.
Q And have you consistently been licensed since that time?
A Yes. It's never lapsed.
Q Returning to the subject of Love Canal and Hyde Park which we were talking about before, you

twice mentioned that as somehow, in your mind, connected to the advent of Superfund. Can you explain that relationship.

A Well, just if you look at the history of the Superfund legislation, what promulgated the congressional action was the press, the notoriety of Love Canal. And the reason we mentioned Hyde Park is because actually Hyde Park was significantly more contaminated and more toxic than Love Canal. However, Hyde Park was an industrial area owned by Hooker Chemical, whereas Hyde Park, you had citizens living -- you know, it was a residential area.

Q You mentioned that in connection with those contaminated sites, you apparently for the first time recommended the use of what were then new computer modeling techniques to answer some of the questions associated with those sites?

A I did not recommend. My colleague, Richard Johnson, who has just deceased this past December, actually was an engineer/geologist back in the 1960s when they were digging the power canal for the Mohawk Power Company. And so he saw the geology and how the water was flowing and all of that. And this is in deposition, so you can pick that up. But they were asking him questions that you really could not answer

without a computer simulation program.

And so that's -- he and I worked on the Florida Rassa, so he was head of the Florida Rassa. So that's why I was working with him at the USGS. And so as sort of a side project, he suggested to them that computer simulation could address a lot of the questions that they were being asked in court under litigation, rather than speculating.

Q And were those models, in fact, put together?

A We put a model together. We put a cross-sectional model together.

Q And the computer model that you and Dr. Johnson put together, did it generate data results?

A Yes.

Q And the data and results that were generated from that computer model, did they become part of the data set that represented the findings with respect to what had happened at Love Canal?

A They represented the -- at that time, current 1980 to 1982 conditions of groundwater flowing through a section of limestone that exited to the gorge of Love Canal, of which the Hooker Chemical Company landfill was sitting on top. And it

presented results of how long it would take a particle of water -- and, hence, a particle that may have been contaminated -- to flow from the landfill to the gorge. And it provided different ranges of values depending on the different geologic medium, whether it was glacial till or fractured rock.

Q And did those results from that computer model then go on to be relied upon by people making decisions about --

A They were presented to EPA, and then they, I assume, were -- they were presented to EPA, and EPA used them -- or used the results in their legal briefs. I did not ever see the legal briefs.

Q Of course. But the results were used.

A Yes, the results were used.

Q And then subsequent to that whole Love Canal use of those results, politically we then see Superfunds spring up from that?

A That's correct. That's correct.

Q And that was really my question.

I want to return back to the subject of your work in Georgia when you were dealing with that situation where you had historically significant agricultural pumping from that aquifer and you were studying the effect of that.

Was what you were studying have been fate and transport?

A We did not study fate and transport for a couple of reasons; the first being, we had a cooperative agreement with the State of Georgia, and our specific task was to look at the impact of pumping in terms of water withdrawal, okay, not in terms of, say, pesticides and all of that. Secondly, at that time the State of Georgia did not acknowledge that there was any pesticide contamination. Okay. We obtained samples with pesticide contamination in there, and I don't recall which ones they were. It's in a report that I did, and I have that.

But it was really our task -- the motivation was, you had at that time the banks requiring, as collateral, farmers installed irrigation systems. And these are not small irrigations. These are center pivot systems that can be a mile in diameter. And from the area you see the big circle in the ground. And they withdraw, you know, hundreds of thousands of gallons of water. And in South Georgia, you could drill down, you know, a couple of hundred feet to just a thousand feet, which is very inexpensive, and sink a well and irrigate.

So the State was concerned about ordering

the aquifer. And so as part of the USGS cooperative agreement with them, we had this study to go on to assess what impact the current pumping -- at that time, 1980 -- and what potential there was for further development of the agricultural lands.

Q And what methods did you use?

A We used a computer model. We used a two-dimensional finite difference computer model at the time that the USGS had developed, and gathered field data and calibrated the model and produced the results and produced a couple of reports.

Q The use of these computer models that you've described now in a couple of different contexts, is that a standard practice in your professional field?

A Yes.

Q Are these accepted methodologies?

A Yes.

Q And how are their reliability -- how is their reliability assured?

MR. BAIN: Objection; vague.

BY MR. ANDERSON:

Q Well, how is the reliability of these types of computer models tested?

A The models are calibrated, meaning that you have gathered or have obtained some field

information, that data. And the model --

Q Let me stop you there. And just so this record is clear, when you say you've obtained some field information, some data, are you talking about actual sample results?

A Yes.

Q Okay. Go ahead.

A And depending on the purpose of the model, you will obtain different types of data.

Q For instance, if you're trying to just figure out whether you're draining the aquifer, you might obtain samples showing the quantity of water. But if you're trying to determine pollution, you might take samples of the contaminants?

Is that what you mean?

A Qualitatively, that's correct. Technically, we would go and measure water levels and wells. They may be existing wells. Or if we want to make sure we have accurate water level readings, we will go and install what we refer to as monitor wells, where there are standards for properly constructing them and so on. And then you will obtain water level readings from them. And depending on the focus of your study and the characteristic of the aquifer you're looking at, you may do repeated sampling, you

may do continuous sampling. It's very broad, and the nature and character of the study would dictate how -- the frequency and what type of sampling you would do.

Q Fair enough. And I distracted you a little bit from the main question, which was: How is the validity, accuracy, and scientific reliability of these computer models assured?

MR. BAIN: Objection to form.

BY MR. ANDERSON:

Q How do you check to see if these models are going to give you accurate data?

A The models will give you results, and then there are numerous statistical methods to compare them with the data that you have collected. The model results -- you would compare the model results with the data that you've collected. And you may decide a priori that you want to be within a certain range.

For example, at water levels I may want to be within plus or minus 10 feet of what I measure. It depends on the size of the model of the area that you're modeling and the purpose of the model. And you will use different statistical and visualization techniques to demonstrate that, in fact, the model

provides an acceptable range of reliability compared to the data that you have collected.

Q Okay. These statistical methods that are used to calibrate, are these used to calibrate the model? Is that correct lingo?

A No. They are used to assess the calibration.

Q Okay. All right. I think I understand. These statistical methods that you use to assess the calibration of your computer model, how long have those statistical methods been used?

A They have been used since the beginning of time for -- to compare other techniques and other areas, not just modeling, in other words. So since modeling began, we have needed -- in the late fifties or early sixties, we have needed to test the results of the models because the purpose of developing the model is to obtain information where you have limited or nonexisting data.

Q Is it fair to say that these statistical methods that are used to check the calibration of your computer simulation, to compare the model results of the field data, are based in statistics, the science that is well known to many of us?

A Yes.

Q Founded on that science. It's fine. I'll withdraw the question. When you went to Geosyntech Consulting Engineers, you mentioned you had some role having to do with getting the codes online.

What was that?

A They were a small consulting company, and their primary business was in design and installation of liners for landfills, sanitary landfills. And in doing that, of course, you have to demonstrate that the liner is going to leak, how much it's going to leak over time. And so one way of doing that, you can test that in the lab, but you can also show what's going to happen when you design a landfill where the groundwater is going to flow. And so you need models to do that.

Again, you can instrument beforehand, but most state regulators would like to see some evidence that the liner is going to work. And so they did not have -- their primary business was a liner design, not modeling. And so they brought me in along with another colleague, an older colleague of mine that had retired from USGS. And I set up some computer codes and some analysis methods so that we -- you know, when they needed to assess a design or they needed to answer some litigation, then we could run

the models.

Q Is it fair to say that at Geosyntech you used the same essential techniques that you had used at the United States Geological Survey -- that is, computer modeling, statistical analyses -- to check the calibration of the model?

A Yes.

Q Are those well-established techniques that people in your profession use?

A Yes, they are well established.

Q And how long have they been established, 30, 40 years?

A At least, yes.

Q And then when you moved to the Agency for Toxic Substance and Disease Registry in 1992, you came in, I believe you said, as an environmental engineer.

A That's correct.

Q And you told me, I think, you developed and coauthored the exposure and dose reconstruction program?

A That's correct.

Q Tell me a little bit about that.

A Okay. At the time that I came in in 1992, the agency was right in the midst of answering a GAO.

At that time, I think it's Government Accounting Office. I think now it's Government Accountability Office. They have changed names. Basically critiquing the agency because they had reviewed something like 900 NPL sites. And basically, Congress gave them a limited number of -- a couple of years to review like all 900 of them. And obviously they could not answer certain questions based on, say, one data point at a site who may have been exposed or when they were exposed.

And so the science director of my division as well as the assistant administrator of my agency at the time saw the need to have some quantitative computational ability to predict or reconstruct -- for my agency, primarily reconstruct historical conditions, perhaps predict current conditions and/or -- or predict future conditions. And so we wrote a -- out a plan to have such a program funded that would bring in different techniques, state-of-the-art techniques, impart some of this knowledge on the health assessors of the agency, as well as establish, say, a cooperative agreement with a university partner who develops models all of the time.

And if we need a certain model that we don't

have in hand and we don't have the personnel or the funds to dedicate to developing it, we could go to a university partner through a cooperative agreement and work with that. And that program, I think, was established in 1993, and it goes every five years. And it was just renewed again for -- a couple of years ago for the next five years.

Q You used an acronym NPL sites. Do you mean National Priority List?

A Yeah, the list --

Q The federal list of sites?

A Yes.

Q Contaminated sites?

A Put on by EPA.

Q The answer is yes?

A Yes.

Q And in terms of the exposure, slash, dose reconstruction program, was the purpose of your work in connection with that to aid in the assessment of how much people had been exposed to various chemicals in various situations?

A It was more general than that.

Q Tell me what you mean.

A It was to assist the agency in quantifying exposures where we had limited or nonexisting data or

information, and also to develop techniques, these type of computational techniques, so that the health assessors at the agency would have these tools available to them.

Q All right. But in terms of its function, ultimately it had do with the exposure in dose reconstruction. That's what its name was.

A That's what its name was. Okay.

Q And why was it called exposure and dose reconstruction?

A It was basically to try to provide a program for two different disciplines. The area that we worked in, exposure analysis, is really at the intersection between environmental science and health science and toxicology. In environmental science, we speak about concentrations and exposure to that. Can be exposure. And toxicology and health science, you speak about doses, internal doses. And so the program was really meant to help bridge a gap in there so the engineers could sort of speak to the toxicologists on the same level or understand each other.

Q And your computer models would provide the reconstruction of information to allow the connection between exposure and dose?

A Yes.
Q And in doing that work at the Agency for Toxic Substances and Disease Registry, were you working on behalf of the federal government?
A Yes.
Q And you were doing that work within the course and scope of your duties?
A Yes.
Q And the methods that you employed in the course of that work were the same methods that you described before; statistics-based, computation-based models?
A Yes.
Q And they were reliable for the same reasons that you described previously?
A Yes.
Q And, in fact, the U.S. Geological Survey is also an agent of the federal government, correct?
A That's correct.
Q And you, as you told me before, used those same methods within the course and scope of your work as an agent of the federal government during those nine years that you worked for U.S. Geological Survey, correct?
A Correct.

Q Nowadays you're a research environmental engineer?
A That's correct.
Q Could you tell us what that means.
A That's a classification in the civil service part of the government. The Office of Personnel Management has a classification that is referred to as a research grade system. And under that system, you can be both promoted and, I assume, demoted based on certain criteria of the position, as opposed to just a standard civil service position. For example, on the complexity of the research project that you're working on, on the colleagues internally and externally that you associate with. And probably the heaviest, weighted -- there are four factors to assess you, and the fourth one being -- which is weighted twice as much -- is the publications that you produce in both peer-reviewed to non-peer-reviewed outlets.
Q Through that process that you just described, have you ever been promoted?
A Yes, I have.
Q Has that been repeatedly?
A Yes.
Q And that's been within the course and scope

of your work for the United States Government?
A That's correct.
Q Have you ever been demoted?
A No, I have not.
Q And what is the total number of years of experience that you have, as you sit here today, with the computer models and the statistical methods used to check their reliability?
A Approximately 34 to 35 years. That's going back to my bachelor's degree.
Q And your publications -- have you published anything?
A Yes, sir, I have.
Q Have any of your publications been peer reviewed?
A Yes; many of them.
Q Have any of your peer-reviewed publications dealt with the methodological techniques you described previously, the computer models and the statistical methods used to check their reliability?
A Yes, they have.
Q And have those techniques been peer reviewed? That is, your --
A The techniques themselves have not because those are established techniques. The use of those

techniques described in the peer-review publications have been peer reviewed and published.

Q Thank you for the precision of that. Repeatedly, I take it.

A Yes.

Q In what areas would you consider yourself to have expertise at this point?

A Numerical modeling -- broad category -- environmental engineering, environmental fate and transport analyses, and scientific report writing.

Q What is fate and transport?

A Fate and transport describes the process that a contaminant undergoes irrespective of the media it's in, whether it's air, soil, water, groundwater; where transport refers to the movement of a particle of contaminant with, say, a drop of water; and the fate refers to either chemical degradation, decay, different properties, chemical properties, that a compound may undergo as it's moving along a path.

Q Would that include breakdown products?

A Yes.

Q We'll come back to that subject a little later on. And you mentioned scientific report writing. Certainly having read some of your work, I

can see that that, in and of itself, is quite an undertaking.

What, if any, basic ground rules are there that you have learned with respect to scientific report writing?

MR. BAIN: Objection; vague.

BY MR. ANDERSON:

Q You can answer. He can object for the record. It's okay.

MR. BAIN: Go ahead and answer.

THE WITNESS: Oh, okay. I wasn't sure.

BY MR. ANDERSON:

Q Here is the question again: What are the rules, if any, for writing one of these scientific reports?

A There are no rules, but there are general guidelines to go by. That is, clearly state the problem that you're writing about, present the data as field data and clearly identify it as field data, clearly identify what is computer simulation, state the assumptions and limitations that you are using, and justify why you are making those assumptions and limitations. And then finally draw the conclusions based on the problem, the data, the assumptions, and the results that you reviewed.

Q You mentioned clearly identifying the field data. I note that you and your work on the Marine Corps base at Camp Lejeune, which obviously we're going to talk about, you cite repeatedly to the source material, identifying the field data and other documents reviewed in footnotes and by name.

Is that part of the method that you have employed in the course of your scientific report writing?

A That is a more specific method that we used in this particular case.

Q Okay.

A And other cases like journal articles, you may just reference other peer-reviewed documents and not go into quite as much detail as we have done with the Camp Lejeune publications.

Q Are there internal rules or advisories from the Agency for Toxic Substances and Disease Registry with respect to citing documents in studies like these?

A They have policies.

Q Could you tell me about those.

A The policy is to reference the information and identify the source.

Q Is it correct that the policy, in fact, is

to reference each and every source that you rely upon?

A I could not state that specifically because it's been a while since I've actually read their policy, so I can't speak about the agency's specific policy.

Q How would that policy be described if we wanted to request a copy of it from Mr. Bain?

A I would say it would be their scientific publication policy.

Q Okay. And in terms of the work you actually did regarding Camp Lejeune, did you, in fact, attempt to cite everything you were relying upon?

A We cited everything that we used in a specific report. So although the Tarawa Terrace analysis is compromised of, say, 11 different reports, different reports might not use the same -- Chapter A may not use all of the references that Chapter B or Chapter C, so I would not need to reference those documents unless I was referring to out of Chapter B or C in Chapter A.

Q Sure. And I understand that.

But with respect to whatever it was that you were referring to, you cited it, didn't you?

A Yes, sir.

Q And anything that you relied upon in any of those 11 reports as part of the basis for your scientific study, you cited it.

A Yes, sir.

Q What was your role with regard to that study? And I'm just going to -- if it's all right with you, I'm going to call it the Camp Lejeune study. Can we agree to call it that, or how would you --

A Can I just see what --

Q I'm looking right now at the summary of findings --

A I would call that the Tarawa Terrace analyses because there is a difference, if that's okay.

Q Yeah, that's better. And let's use Tarawa Terrace -- T-a-r-a-w-a, Terrace -- to refer to, if we can, all of the work you did on that. And I know it comprises a whole body of reports, you'll be glad to know we're not going to cover every page of every one of them.

A Thank you.

Q Can we call it the Tarawa Terrace report?

A That's acceptable.

Q What was your role in the Tarawa Terrace

report?

A My role was really three-fold, from a -- and I'll start with a larger or systematic overview -- was to provide results for the epidemiological case control study in terms of monthly concentrations of specific contaminants in the drinking water at Tarawa Terrace.

Q Did you do that?

A Yes, we did.

Q Did you do any sort of probabilistic analysis to determine the reliability of your results?

A Yes, we did.

Q And what was the outcome of that probabilistic analysis?

A And that is actually published in Chapter A as well as a subsequent chapter in more detail. And those results and those chapters show that there was a range of between two and a half and three, meaning that for whatever concentration the model came out with at a certain given point in time -- let's just say 50 micrograms per liter, and I'm using that just as an example -- then the rage of that value -- that value could range anywhere from two and a half -- higher to two and a half times lower than that value.

Q So if we had generated model results of -- we used the words "micrograms per liter" -- say you had 81 micrograms per liter, it could actually be two and a half times that much or it could be two and a half times smaller.

A That is correct.

Q That, to me, sounds very loosey-goosey.

A In fact, it's not.

Q Explain.

A It's considered a -- what we refer to as a very tight range, because typically when we're dealing with water quality, type of data or simulation, the general rule of thumb is to be within one order of magnitude or a factor of ten. So the fact that we were well within the level factor of five even, we felt provided a very robust reliability for the model.

And, in fact, we were told by the senior epidemiologist on the Camp Lejeune project that that was well within acceptable ranges that they could use to work with. It was, as they put it, much more refined than the crude epidemiological methods that they used.

Q And you're referring to Frank Bove and his team?

A That is correct.
Q All right. Now, you used the phrase "micrograms per liter," and I -- forgive me. If I was really capable at math, I would probably be a doctor at this point.
How does that relate to parts per billion?
A That's the equivalent. We use them interchangeably.
Q Okay. So if something says 80 micrograms per liter, that's 80 parts per billion?
A In this situation, it is. With these contaminants in the situation at Camp Lejeune, that is correct.
Q And explain that to me so that I understand. When would it not be correct, and why is it correct here?
A Well, there -- to do the calculations, it involves density properties and temperature, standard temperature, standard things. And if those -- and under these conditions, we do not have density effects --
Q I see.
A -- in other words, dissolved in water. So we can make an equivalent computation to show that it's the same.

Q Okay. So if there were density issues, you could not make the -- you could not just assume that micrograms per liter equals parts per billion, but because they are not here, you can. Is that fair?

A You would have to have a conversion factor -- a conversion factor. Here the conversion factor is one, okay, in other words. But you would have to have a conversion factor, and then you can convert micrograms per liter to parts per billion.

Q Will the same be true for benzene?

A Yes, it will.

Q And is the fact that the conversion factor with these chemicals -- now I'm talking about benzene, trichloroethylene, and tetrachlorethylene -- is one, that is, from micrograms per liter to parts per billion as a equivalency. Is that a generally scientifically accepted fact?

A Yes.

Q What was the goal of the Tarawa Terrace study? What was it trying to do?

A It was -- the goal was to quantify monthly concentrations of specific contaminants in drinking water.

Q Why?

A The epidemiological study being conducted is

referred to as a case control study. And for that, they needed to know what the concentration of the water that people who were exposed to contaminated water ingested so they could compare that to the concentration of water that people who were not exposed, or in their analysis. And so they have to have the -- since we're doing in utero and up to one year of age study, they needed to know per month what the concentration of the drinking water that the mother and/or fetus and/or child up to one year of age ingested.

Q Why did they want to know that?

A They need that to do the case control study to compare experiences or diseases -- experience of those people with disease against those people who do not have the disease.

Q Is a simple way to say this, that this whole Tarawa Terrace study and the epidemiology that it relates to is trying to figure out how much disease the water has caused, if any?

MR. BAIN: Objection to form.

BY MR. ANDERSON:

Q Is that what this is about?

A That has never been stated to me in that way.

Q Why are they doing an epidemiological study with mamas and babies and trying to determine how much chemicals they were exposed to in the water and then talking about the disease history?

MR. BAIN: Object to form.

BY MR. ANDERSON:

Q Help me understand that. What's your understanding of it?

MR. BAIN: Same objection.

Go ahead.

THE WITNESS: My understanding is, the reason you do a childhood in utero study, because we're studying rare diseases. And rare diseases, you need to take out confounders that adults would experience, such as life experiences; smoking, where you live, drug usage, legal and otherwise. And so children do not have those experiences, so you can take those confounders out of the calculations.

And so -- so you look at -- so from that standpoint, you can get a much better understanding of any associations between exposure to contaminated media and rare diseases such as birth defects, childhood cancers. And that is the purpose of our current study, is to

establish, in fact, are there associations between ingesting contaminated drinking water and a higher prevalence of childhood birth -- specific childhood birth defects and specific cancers.

BY MR. ANDERSON:

Q Why did they wonder about that? In other words, why was there even a question about whether there might be associations between exposure to these types of chemicals and these diseases in children?

MR. BAIN: Objection; lack of foundation. Go ahead.

BY MR. ANDERSON:

Q Well, I mean, I'm just parroting the last answer you gave. You told me there's an inquiry into whether there are associations between exposures in these chemicals and certain diseases in children. And I'm wondering: Why did that question arise?

MR. BAIN: Objection.

BY MR. ANDERSON:

Q You can answer.

A That was a recommendation out of the 1997 public health assessment that recommended that there was lack of knowledge of the effects of compounds -- certain compounds described in the health

assessment -- on children. And so it recommended follow-up studies of -- follow-up health studies, of which the current study is just one part, one particular study, to address that.

Q Had there been prior indications in the literature that these chemicals were harmful or might be?

A That's really outside my area of expertise. You need a toxicologist to answer that.

Q And I understand. I'm just -- I'm asking you based on what you read in connection with your work. I mean, did you read the 1997 public health assessment?

A Yes, I have.

Q And so you know, don't you, Doctor, that there were prior studies and scientific reports suggesting an association between exposure to these chemicals and various types of disease? You know that, don't you?

MR. BAIN: Objection. Document speaks for itself.

Go ahead and answer if you know.

THE WITNESS: The reason our current study is being done is because there's a lack of studies. In other words, the studies are

inconclusive to date. There are very few of them. And so one of the reasons this study is being done is to try to build that scientific body of knowledge.

BY MR. ANDERSON:

Q Right. I mean, it's not every day that you get a whole bunch of people exposed to these kinds of chemicals to where you can actually study them, right?

A That is correct.

Q And so that's one of the reasons why there's not a lot of studies.

A That is correct.

Q But in terms of the studies that there are, you know, as you're sitting here now, that some of those studies suggested associations between exposure to these types of chemicals and various diseases, don't you?

MR. BAIN: Same objection; lack of foundation.

THE WITNESS: Some have established that, yes.

BY MR. ANDERSON:

Q Yeah. Now, in terms of the database for the Tarawa Terrace work that you did, what have you

reviewed and studied in preparing those reports?
A We have gathered, reviewed, extracted field data from the Tarawa Terrace area; basically, hydraulic data, hydrologic data, geohydrologic data, contaminant data, and -- at Tarawa Terrace and outside of Tarawa Terrace, as well as other analyses of similar fate and transport and modeling analyses.
Q Obviously you knew that this was very important work you were doing.
A Yes.
Q And you understood that it could potentially have an impact on perhaps even millions of people's lives.
MR. BAIN: Objection; lack of foundation.
BY MR. ANDERSON:
Q You realize there's about 1.3 million people who potentially were exposed to this contaminated water at Camp Lejeune?
A I have not heard that figure being that high.
Q Well, you knew it was important to get it right.
A I know it's important -- this goes for anything that we do -- to have a product that is scientifically defensible.

Q And you -- from what I can tell reading it, you took every step you could to ensure that that was the case.

A That is correct.

Q Okay. And you employed methods that you believe, as you're sitting here now with 34, 35 years of experience, were scientific valid.

A Correct. That's correct.

Q And they were the same methods that you had utilized at the other agencies of the United States Government such as the U.S. Geological Survey, correct?

A That is -- generally speaking, we used, I believe, more sophisticated methods.

Q Well, were they in any way so sophisticated as to be, you know, novel and unreliable?

A Not unreliable. Novel application, yes.

Q Tell me about that.

A We were predicting -- or reconstructing backwards in time for 30, 35 years at a monthly interval, which is a -- from a groundwater modeling standpoint, a fairly fine timeline, typically. And in terms of, say, remediation practices where they use these similar models, you may look at years -- or five -- of years trying to clean up. So you do not

necessarily see published results in terms of monthly values. So that was a very refined time step in terms of a groundwork model.

So from that standpoint, that's probably, you know, edge of the envelope of what's been done. And we also went to numerous methods to look at some different aspects. Once we obtained initial reports, calibrated results, we then went to look at, well, what happens if the wells pump at a different rate than we assumed; also looking at the degradation byproducts and things like that. So we employed numerous models to, again, not only refine our understanding but also may show that our results were scientifically defensible.

Q Okay. There's a law called Daubert which says that the only kind of evidence that a federal court will consider that has a scientific aspect to it is evidence that's scientifically reliable.

And when you say that the getting down so fine as to determine monthly exposure values is, quote, edge of the envelope, is that scientifically indefensible, edge of the envelope, or is that just -- tell me -- explain to me and explain to the judge who may be reading your words someday why we can rely on the monthly results you obtained.

MR. BAIN: Object as to form.

You can go ahead and answer it.

THE WITNESS: We could rely on the results because we followed a scientific practice, as we previously discussed, of laying out all of the data, the information, showing the assumptions -- clearly stating the assumptions we made, clearly stating the limitations, and calibrating the model to compare the model stimulated results with the field data; and then also conducting sensitivity analyses, which means -- part of that is the probabilistic analysis that shows that the model does produce different values but they are contained within a certain envelope or a certain range. And that range is within an acceptable limit for anybody who does this or is involved in this type of work, not just the epidemiologist but I'm talking about the environmental engineers.

BY MR. ANDERSON:

Q Did you use in preparing this report the same essential tools of your career, that is, the computer models, the calibration of the models, the statistical analyses?

A Yes.

Q Generally accepted scientific techniques.
A Yes.
Q And was your work peer reviewed?
A Yes, it was.
Q And was it found to be scientifically reliable by the peer-review process, or was it peer approved, I guess?
A It was peer approved.
Q I noted that in the forward to the summary of findings, it says that the study protocol received approval from the Centers for Disease Control and Prevention institutional review board.
Is that correct?
A That is correct.
Q Tell me what that involved.
A You would have to ask Dr. Bove because that involves human subjects and the epidemiological side.
Q But your study protocol did receive approval.
A The entire study, not the modeling. The health study received.
Q Okay. And then it says that you used -- it says: ATSDR is using water-modeling techniques and the process of historical reconstruction to quantity concentrations of particular contaminants in finished

water and to compute the level and duration of human exposure to contaminated drinking water.

Is that a true statement?

A That is a correct statement.

MR. BAIN: Counsel, can you tell me what page you're reading from.

MR. ANDERSON: III.

THE WITNESS: The forward.

BY MR. ANDERSON:

Q In terms of the peer review you described, was there peer review of the results of your study or a peer review of the techniques used to do your study?

A Peer review of the report. When a report -- a draft report is completed, we will send it out -- or it's my practice to send it out to colleagues -- they can be internal or external; in this case it was external -- who have expertise in these methods and these types of analyses. And so we sent this report out.

Chapter A, let's talk about Chapter A. And offhand I can't remember if it's two or three different people that I sent it to, the documentation. But I don't recall how many people I sent it to. It was at least two. To review the

report, both -- you will choose whether you want to review it from the report entity itself, from a public health standpoint, from a technical modeling standpoint.

So you will send it to different people like that, and they will provide you comments back on it. And, of course, you are free to accept or not accept the comments depending on what their particular comments are. But we do -- for these all -- the Tarawa Terrace series reports, they all underwent peer review.

Q And all were peer approved?

A Yes.

Q Now, you mentioned Chapter A as having been through the peer review process as well, and that is the summary of findings for Tarawa Terrace.

A That is correct.

Q And so your actual report findings on Tarawa Terrace have been peer reviewed.

A That is correct.

Q And peer approved.

A I would say peer reviewed is the correct term that I've always used. Never heard the term "peer approved."

Q Well, I just made it up. What I mean to

suggest is, when you had your peer review, they didn't tear the thing up and throw it in the trash. They came back and said, Well, we may comment here and there, but we're peer reviewing it in a positive fashion.

A That is correct.

Q Okay. That's all I meant.

A That is correct.

Q And you reached results obviously.

Am I correct that the monthly results that we have mentioned several times are included in Appendix I-5?

A I've have got a copy -- oh, okay, since you've got that. I-5 is from Chapter I, I believe. Oh, maybe not. Let me. Appendix I-5.

Q There's a front page to that.

A Okay. Because I think -- oh, Appendix I-5. Yeah. If I can, I've got both Chapter A and Chapter I here, and I forget how we named the appendices.

Q Why don't you just show me where your bottom-line results are, and we'll use your copy.

A Chapter I is really the enhanced sensitivity analysis, whereas Chapter A is the summary. So, yeah, Chapter I -- the -- Chapter I -- Appendix I is

from Chapter I.

Q Okay.

A And, yeah, that's the probabilistic analysis, which I do not believe we put in Chapter A in its entirety. So that's the difference. The same -- the same, what I call, mean value results that are shown in Chapter A in the appendix, like A-2 and so on, are also in Chapter I, but what Chapter I does is give the range of values.

Q Okay. Well, if a person wanted to know, for instance, what he or she was exposed to living at Tarawa Terrace at a particular month that was covered by your study, where would we look?

A The best place to look is in Chapter I because it would give you the 50 percent or median value and then it would give you the range with the high and with the low. Again, if you just wanted to speak about an average value, then you could refer to Chapter A because it's the equivalent, basically, to the median value in the statistical analyses presented -- probabilistic analyses shown in Chapter I.

Q Well, in terms of -- since you suggest Chapter I as more complete --

A It is more informative.

Q Let's use that. Let's use the most informative.

Is the copy that I have here, is that the most informative and complete that you're referring to, or do I need to use the copy you brought?

A That should be. If you pulled it off the Web or made a copy of the published report, then that's the same that we have sitting right here on the table, and that is for PCE. Okay.

Q Would it be all right with you if I used your published report as an exhibit?

A Sure, sure.

Q Thanks. I will just mark it as --

MR. BAIN: It's not your only copy, is it?

THE WITNESS: No, no, no. I mean -- no, no, we got a couple hundred more at the office. But it's my own copy too.

MR. BAIN: Let's go off the record.

(Brief discussion ensued off the record.)

BY MR. ANDERSON:

Q I'll just mark it as Exhibit 1 to your deposition. And I appreciate you letting me have it.

(Plaintiff's Exhibit Number 1 was marked for identification.)

THE WITNESS: I would -- if I could just

preface that, is, Chapter A was meant to give a complete summary of all of the analyses we did; geohydrologic, water quality, and things of that nature. Whereas Chapter I was specifically targeted to assess the model simulations.

BY MR. ANDERSON:

Q In what sense? What do you mean by that, to assess?

A Well, good modeling practice requires that you conduct -- after you calibrate a model, you conduct a sensitivity analysis; that is, how sensitive are model parameters, because we don't have data for each parameter, that if you change -- if you happen to a year from now get some additional information that changes a value of a parameter that you coded into the model, how would that impact your final results.

And so we provide a quick summary in Chapter A, but Chapter I is the more in-depth analysis. And it not only does the groundwater flow model, fate and transport, it also does the water distribution system model.

(Brief discussion ensued off the record.)

BY MR. ANDERSON:

Q What is this -- I'm now looking at the

Appendix I-5 -- what do those numbers reflect?

A Okay. In Appendix I-5, basically the stress period is model jargon. That's equivalent. One stressor is equal to a month of a year. So stress period number one would be like January 1950, I think -- January 1951 would be stress period one. And then it goes each month -- each stress period. That's so that we could easily identify in the model. The model doesn't know about months.

Q Right, right.

A So that's what that means. The month and year corresponds to the month and year that the model simulation was applied to, starting in January '51 and going all the way through -- in this report, we stopped at March '87 which is when the last water supply well was operated.

Q And then the next one?

A Then the calibrated PCE concentration. That is the mean value that came out of the model of the original mod flow MT3DMS models. We have always said that represented a mean value.

Q And --

A Or an average value.

Q And you mentioned mod flow and MTDMS.

A MT3DMS.

Q MT3DMS. Are those models?
A Those are computer codes. Mod flow is produced by the U.S. Geological Survey and publicly available. And MT3DMS is a fate and transport model code, I believe, out of the University of Alabama. And it, to use layman's terms, hooks on or uses the results out of mod flow to do the fate and transport.
Q And have both of those -- that is, mod flow and MT3DMS -- have both of those been utilized in other studies and other settings?
A Yes.
Q Are both generally accepted?
A Yes.
Q All right. Go on and tell me now. It says: Calibrate PCE concentration --
A So those are the values also reported in Chapter A that represent the mean or average monthly concentration of PCE.
Q Are those reported in micrograms per liter?
A Everything I talk about will be in micrograms per liter.
Q Which is in this case the same as parts per billion?
A Parts per billion; that is correct. Then the remaining columns represent the probabilistic

analysis that we conducted, that is described in detail in the main text of Chapter I. And we used the terminology and approach that is similarly used in other branches of science like petroleum engineering when they want to know what's the probability of finding oil. There is no one value. There's a median value, and then there's a two and a half percent and 97.5 percent range.

Q Okay.

A And so we used the same approach. That's a standard way of presenting this in tabular form. And so that gives you the low range -- low value and the high value of what the concentration could have ranged at any particular month and time that the simulation was applied to.

Q All right. Let's break that down a little bit. There's a scenario one and a scenario two. Tell me about those two different scenarios?

A In scenario one, we varied number model parameters, but we kept pumping. The amount of water was drawn from the ground -- from the water supply wells the same as we did in our original model. We assumed that it was not probabilistically distributed. That is, there was no uncertainty to the pumping.

Q It was static?
A The pumping changed month to month, but the value of the pumping, there was no uncertainty about it.
Q Okay.
A Okay? And that's what --
Q I see.
A -- we did, okay, in other words. That was scenario one. Scenario two assumed that even pumping was uncertain, so that if someone was pumping, you know, 2000 gallons per minute, that may have been a mean value, but that could have a range on either side.
Q By a factor of what?
A We used a normal distribution, and I couldn't -- there's a graph -- there's a typical graph in there. I couldn't really tell you a factor. But we generated a probabilistic distribution for pumping for each month.
Q Okay. And these two scenarios are called Monte Carlo simulations.
A That's -- I think that's used.
Q Sure. And I understand it. I'm wondering -- for the Court, can you just explain what a Monte Carlo simulation is.

A It gets it's name obviously from Monte Carlo, gambling casino, because you've got different odds of winning or losing. And it uses the same technique. It generates many, many -- in this case, several hundred -- five or six hundred different times. So for each month, the model is run over and over and over again with different parameter values based on different probabilistic distributions, not just the mean value but a range of probabilistic distributions. And so you can get different combinations of values.

And what we want to see, again, does that infinite range of parameter combination and values -- does that give you reliable results, or does that give you such a large range that you can say the results are not necessarily reliable.

Q And in this case, what did you find?

A We found out that our results were very consistent and had a very narrow spread or a very narrow range in value for each given month about the mean.

Q All right. How should we understand this in terms of what you're actually saying? If you could turn to stress period 350.

A Okay. Right here. Got it.

Q This is the February 1980 set of values.
A Right.
Q Now, the mean value is -- I'm going to use parts per billion.
A That's fine.
Q 122.98 parts per billion. And just for the record, what does mean value indicate?
A Mean is the average -- average value. Let me --
Q Go ahead.
A Let me explain something. Look at -- we've got one thing that says it's calibrated as mean value, and we also have a column that says "P50," which is a 50 percent value.
Q Yeah, I see it.
A We are assuming that our results -- and this is a typical assumption -- that they are normally distributed. Many things in science and engineering behave according to a bell-shaped curve. Okay? And so what we are assuming is that the mean, the median, and the mode are the same value, meaning it's a normal distribution. It's not going be exactly that. But you can see, for example, the mean value or the average value is 122.98, which we can say 123 for argument sake, round it off. And the P50 is 122.

Q Right.
A They are nearly -- you would call that the same value. Okay?
Q Right.
A And that's just a reference and, again, presenting the P50 as a standard practice in other sciences. It basically shows you the spread about a middle value, and we're assuming that spread is bell-shaped curve.
Q Okay. And you have P2.5 --
A Right.
Q -- and P97.5. Those are at the outer edges of --
A Those are at the -- what we refer to as the tails of the distribution if you have a bell-shaped curve. So the P50 is right at the center and then the other two at the other two extremes.
Q Okay. And that's the -- what you told me about before when you said it could be off by an order of magnitude of two.
A I said it could be off by a factor of two, two and a half, like that. That's basically --
Q That's what's reflected here?
A That's where we derive that general number from, is we went through all of these and looked at

the spread on that. And I'm using two and a half as a round figure. It could be less than that. In this case, it's, you know -- that's right in there to -- to -- in other words, 123. The high is 171. So it's much narrower than that. But there are some places where that does spread out. But it was well below five and well below an order of magnitude.

Q And so, therefore, useful for the epidemiologist.

A Yes.

Q In looking at this now, I see that the mean value is 122.98, and I'm going to go ahead and use the precise figures because of the record. I'm looking at stress period 350. The mean value is 122.98. The P50 value under Monte Carlo simulation, scenario one, is 121.80, which you indicated for practical purposes is essentially the same thing.

A Right.

Q And then if you go over to Monte Carlo simulation two, the mean value -- the P50 -- excuse me -- is 131.23, again, right in there.

A That's correct.

Q The other figures on that line, you know, the outliers obviously somewhat mirror each other.

But does the fact that the mean value and

the P50 under both Monte Carlo simulations is so consistent -- does that tell us anything?

A It basically confirmed to us that, in fact, assuming a normal distribution was appropriate, that it was behaving that way, appropriately.

Q Does it tell us that --

A The model was behaving appropriately and that we did not make an assumption that it was normally distributed parameters. And then the results are way out in left field.

Q Okay. So it tended to confirm the reliability of your assumption of a normal distribution.

A That is correct.

Q And, therefore, tended to confirm the validity of the work you were doing, the results you were getting.

A That is correct.

Q Does the fact that the mean value, the Monte Carlo scenario one P50 value and the Monte Carlo simulation scenario two P50 value, are so similar tell us anything about the actual -- the likely actual exposure -- or I should say the likely actual quantity of contaminants in that month?

In other words, does the fact that those

things are similar numbers give us any information about what the actual numbers should be? I'm trying to ask: Does it help us rule out, for instance, the 206.13 and the 77.7?

A No, it does not --

MR. BAIN: Wait a minute.

Objection as to form.

Go ahead.

BY MR. ANDERSON:

Q Go ahead.

A No, it does not; because all of those numbers -- basically in the probabilistic distribution, we're saying those numbers are equally likely. Okay? In other words, that's what we're saying, and that's why that's important for the epidemiologist to use. They can use that range -- that range in there. What it does say to me is that, in fact, yes, there is some uncertainty associated with pumping, with the actual pumping, because it is a slightly different number.

Q Right.

A And that we should take into account the variability and uncertainty with all model parameters, which is what we did. Pumping, just like any other model parameter, contaminant source, or

anything is subject to uncertainty because we do not have -- even when we have measured data, we do not have a complete set of information. So it's important to conduct these analyses. But it does give us confidence in our results.

Q So all we know -- and I don't mean to suggest that this is not a lot -- but at the end of the day, we know that for stress period 350 from February 1980, the amount of contaminants in the water at Tarawa Terrace ranged from 77.70 to 206.13.

MR. BAIN: Object to form.

BY MR. ANDERSON:

Q Is that the truth?

MR. BAIN: Object to form.

BY MR. ANDERSON:

Q Is it somewhere in between those?

A That's a factual statement based -- that's what these numbers represent.

Q Right. And you're talking about, in this one, PCE only; is that right?

A This is only PCE.

Q Is there a table in there for any other contaminant like TCE?

A I do not believe we conducted this for -- for the degradation products. I did not publish a

probabilistic analysis for the degradation products of PCE and TCE, DCE, and vinyl chloride, although the same technique could be used.

Q Is there a reason why that wasn't done?

A Just space and time. We presented the mean values of those degradation products in Chapter A as well as Chapter G, which was specifically on the degradation products. And my feeling was, if I could demonstrate how to apply this method just to PCE, the same technique could be applied to the -- to the other values, and you could generate ranges as well.

Q What is your understanding of the contaminants in the water at Tarawa Terrace? I'm understanding that there is both TCE and PCE. Is that your understanding?

A There's PCE and TCE. We also had measurements of DCE.

Q Which is -- for the record, it's 1,2-dichlorethylene?

A That's right. And there's two different congeners, a trans and A Syst. And if I can look in here and see which ones we did, because one was not -- it was the trans that was predominantly at Tarawa Terrace.

Q Now, let me come back to that in a second.

I just want to ask you: Is it your understanding that all of the TCE at Tarawa Terrace was as a result of degradation of PCE?

MR. BAIN: Object to a lack of foundation.

BY MR. ANDERSON:

Q You can answer.

A Our assumption was that, in fact, the PCE at Tarawa Terrace was a degradation product, not a source contaminant.

Q What are sources of TCE other than as a PCE degradation byproduct?

MR. BAIN: Objection to form.

Go ahead.

THE WITNESS: A puriform TCE is used as an industrial solvent. So in many industrial settings, they will use TCE as a solvent.

Q Degreaser?

A Yes, degreaser. It is also used -- just for the record, so we're clear -- TCE can also be used as a dry-cleaning product just like PCE. And, in fact, that issue was raised by our office of science when they were reviewing the report, who asked if we had considered TCE. And since we were dealing with one dry cleaner, the ABC Dry Cleaners, that we knew from their deposition specifically what compound they

used. And that was tetrachlorethylene and perchloroethylene. And so --

Q PCE?

A PCE. So there was no source that we could locate or find for trichloroethylene.

Q So you made the assumption in your work based on that that whatever trichloroethylene we see there is a PCE degradation byproduct.

A That is correct.

Q Did you make inquiries as to whether there were any use of industrial solvents that contained TCE in the Tarawa Terrace area? Did you inquire as to that?

A We looked at the literature and source documents to see what industries may have been in there and all of that, and Tarawa Terrace is primarily a residential area. And so with the exception of, say, a gas station, something like that, there was no industry there. And, in fact, the state of North Carolina in 1985 -- the Shiver Report, in fact, pointed to that ABC One-hour Cleaners, was, in fact, the source for the PCE in the -- in one water supply well on base.

Q Did you, in the course of requesting documents from the Department of the Navy and the

folks at Camp Lejeune, ask to see any documents that had to do with TCE usage at Tarawa Terrace?

A We asked for -- not specifically. Not specifically.

Q Why not?

A Because we wanted to be the ones to determine how different compounds may have gotten into the soil, the groundwater. What we wanted to see was -- and we asked for this -- any and all documents that may contain relevant information for water modeling, that is, documents containing geohydrology, geophysical logs, water-level readings, water-quality sampling. They did provide us -- we asked for building use on base, things like that. But we -- it's important not to sort of -- I tell them I want Document X so I can prove Z. Okay.

In other words, we need to be the ones -- meaning ATSDR -- to make -- read that document and make that understanding. So we ask for every -- all documents that we could use in our water modeling analyses. And we provided them on several occasions with the type of documents and/or the type of data these documents might contain.

Q Would it have been your understanding that your request for documents were broad enough that

they would have included any documents that would have shown, for instance, the disposal of TCE in the Tarawa Terrace area?

A Yes.

Q Would your documents requests have been broad enough to also have covered the presence of fuel tanks in the Tarawa Terrace area?

A Yes.

Q Containing fuel that contains benzene?

A Yes.

Q Did you receive from the government, in the course of those document requests, any information about presence of fuel tanks in Tarawa Terrace?

A Yes, we did.

Q You were aware at the time that this Tarawa Terrace study was published, that there was, for example, a 10,000-gallon fuel tank near the school?

MR. BAIN: Object as to form; lack of foundation.

Answer if you know.

BY MR. ANDERSON:

Q Did you know about that?

A I can't specifically say that I personally knew about it. But we have a Chapter E report, and in Chapter E we discuss with me the benzene

occurrences at Tarawa Terrace.

Q Okay. And did your report on Tarawa Terrace, the one we have been discussing this morning, take into account all that was known to you and your team about the underground storage tanks in Tarawa Terrace in terms of the results here?

A We did not simulate or conduct model simulations for benzene at Tarawa Terrace.

Q Why not?

A After reviewing the data and the analyses that we did based on the underground storage tanks, we did not -- number one -- we felt, number one, that whatever gasoline -- because at Tarawa Terrace there was gasoline holding tank leaks -- was small enough in nature that it did not impact any of the supply wells. So there was no major source of benzene.

And, in fact, the results -- there are, I think, two or three samples at the water treatment plant that are, say, 1 to 4 -- maybe there's a 7 -- micrograms per liter, were substantially low, that it did not, again, indicate that there was a source at Tarawa Terrace for benzene contamination of groundwater supplies that would impact drinking water.

Q So you just said, I believe, that there were

gasoline holding tank leaks at Tarawa Terrace?

A Yes. That's documented in Chapter E.

Q And the treatment plant found benzene in the water, but you felt it was a sufficiently low quantity.

A That's correct.

Q That it would not impact your study.

A That's correct. That's correct.

Q Were the wells actually tested for benzene at Tarawa Terrace?

A I do not -- I do not know if they were tested or not.

Q Now, we've been talking about Chapter I, and you showed me some data there. Can you show me how that relates to the data that you described as being in Chapter A.

A Sure. And I will just go to the results here. If you go to Appendix A -- yeah, Appendix A-2, example in Chapter A. I'm on page A82. Or, for example, let's use the one we've been talking about, stress period 350, just so we can compare apples and apples. And that's on page A91. If we look at February 1980 in Chapter A --

Q Can I come around and stand by --

A Oh, sure, yeah.

Q My copy doesn't go that far. If you don't mind, I won't loom over you, but I just want to see what you're talking about.

A In fact, if we go here to my same stress period, same month and year -- and here we've got single specie using MT3DMS model. So that is the concentration, as a model, PCE in micrograms per liter, parts per billion. And then we go to stress period 350, and we get 122.98. If we go to Chapter I where it says calibrated PCE concentration, stress period three -- 122.98. So this column in Chapter I is the same as this column in Chapter A, identical. I mean, we didn't make additional models. That is those results.

Q Right.

A The rest of the columns are the degradation product in Chapter A.

Q Are they a subset of the PCE single-specie number?

A Not a subset. It's using -- you have to use a more sophisticated model and degrade the PCE.

Q Sure. Are these figures in addition to the PCE, or are they the PCE as degraded?

A It's the PCE as degraded.

Q Okay.

A And, in other words -- so this is why you'll see -- and we'll go back to 350, whereas our single specie -- look only at PCE -- is 122.98. For the degradation model, PCE has to be lower because there's other mass for other products. Okay.

In other words, we're -- in the single specie, we are lumping all of the degradation products. And in the same, PCE does not degrade. That is what we call the most conservative approach. In other words, that would give you the maximum hit of PCE in the water.

Q Right.

A This is a refined and a -- well, not a preferred approach but a more sophisticated approach. And in doing these analyses, that is something that you want to do. This also says that this is in check because we should have a higher value of PCE for the single species as opposed to the degraded value.

Q I understand. And so taking that page A91 in Chapter A for stress period 350, February 1980, your values are, single-specie PCE was 122.98. As we discussed in Chapter I, the PCE component of the multi-species would be 98.2.

A That's correct.

Q And then you have 1,2-DCE at 13.49 --

A That's correct.
Q -- TCE at 4.04, and vinyl chloride at 7.56.
A That's correct.
Q And so assuming -- I take it this assumes that the -- that PCE underwent a normal biodegradation process.
A That is correct. That is correct.
Q So assuming that the PCE at Camp Lejeune underwent a normal biodegradation process, you have a chemical cocktail in the water.
A That is correct.
MR. BAIN: Objection to form.
BY MR. ANDERSON:
Q That's the truth, isn't it?
MR. BAIN: Objection to form.
Do we have an answer?
BY MR. ANDERSON:
Q Can we have an answer.
A Yes. It's underwent, and you had multiple compounds in the water.
Q Right. Multiple contaminants.
A Multiple contaminants.
Q Multiple chemical contaminants.
A That is correct.
Q Yeah. Would it be all right if I also mark

the Chapter A? I'm sorry for marking your copies.

A Go right ahead.

(Plaintiff's Exhibit Number 2 was marked for identification.)

MR. BAIN: Do you want to take a break about now? It's about 11:00 o'clock.

MR. ANDERSON: Can I ask him one or two more questions?

BY MR. ANDERSON:

Q Chapter A is going to be Exhibit 2 to the deposition. And what I wanted to ask you before we go out for our break is just a couple of quick things.

What, if anything, do you know about the health risks associated with these other chemicals in the water, for instance, vinyl chloride? Does that have any health-effect history that you're aware of?

MR. BAIN: Object to foundation -- lack of foundation.

Go ahead.

THE WITNESS: I'm not a toxicologist, and I could only answer in very generalized terms. Not specific health impacts.

BY MR. ANDERSON:

Q Right. And I'm not looking for more than

what you know. I'm just asking based on what you've read in the field that you are in, does vinyl -- is vinyl chloride in the water a good thing? Is that something we want, strive for?

A No, no. You do not want vinyl chloride in the water.

Q And trichloroethylene, do you want that in the water?

A You don't want any chemical compound in the water.

Q So you don't want trichloroethylene, and you don't want 1,2-TDCE.

A That is correct.

Q And obviously you don't want all of those things together, right?

A You don't want any compound contaminants in the water.

Q Why not?

MR. BAIN: Object as to form; lack of foundation.

BY MR. ANDERSON:

Q Why not?

A They have certain compounds that have been shown to be carcinogens.

Q And then the last thing I wanted to ask you

so I can think about it, frankly, when we're on our break is: How am I to understand this data and these tables that we have been discussing? Say, for instance, I was at Camp Lejeune, living in Tarawa Terrace from stress period 350 to stress period 390. Okay?

A Okay.

Q How do I quantitatively deal with the numbers in that box? You would just draw a box around it like I did on my copy. Do you add those up in terms of your exposure? What do you do with that data?

MR. BAIN: Object as to form.

BY MR. ANDERSON:

Q I was there, I drank this water, I showered in this water. I want to know how much I was exposed to. Do I get out a calculator and start adding month upon top of month?

MR. BAIN: Object as to form.

THE WITNESS: You would have to ask really an epidemiologist that specific question because that is not what I do nor what I was tasked with doing.

Q Okay.

A We have provided a similar table like this

on our Web site for anyone to access. And we state there -- it just says the likelihood and the range of what a person may have been -- we use the word, I believe, may have been exposed to in their drinking water at that particular month and day. And that's all I can say, and that's all the modeling results presented in this can say.

Q Okay. That Web site -- there was a Web site at one time where you could actually go in and put in your physical address. Do you remember that?

A Yes.

Q And then it would tell you how much of these various chemical contaminants were in your water at your house?

A That's correct.

Q And then that Web site got taken down.

A That's correct.

Q Why?

MR. BAIN: Objection; lack of foundation.

BY MR. ANDERSON:

Q Just tell me what you know. I'm not asking you for anything you don't know. I'm just getting inside your head and trying to find out what you do know.

A It was -- in working with the Department of

Navy, they expressed some reservations that there were insufficient qualifiers on the data, not the table itself. But when somebody just put in an address and got a value out, it did not explain to them the limits of the data or the simulated data. And they objected to that -- it was the actual application that got taken off of that.

And in working with -- which we want to do working as a -- with a partner, and the Navy being one of them. We decided that the reports were out there. Anyone could grab the reports. We put the table out there. So we took it down off that. The Department of Navy requested that that application, you know, be taken off of the Web site.

Q When did they make that request approximately?

A I really don't recall, but it was after this report was published.

Q So recently, I mean, within the last couple of years.

A Yes, yes.

MR. BAIN: Can we take a break?

MR. ANDERSON: Just one more, one or two more. I'm sorry. All right, all right. I don't want to lose my train of thought.

BY MR. ANDERSON:

Q When the DON objected to that application and asked that it be taken down, was that objection stated in writing?

A Not to my knowledge. I never received a written request.

Q Who would have received that at the ATSDR if there -- if there was a request that that Web site be taken down?

A They probably would have communicated to the deputy director or the assistant administrator at the time. It was more discussed. We have monthly conference calls with the Department of Navy and other -- and that may have been discussed at that time. There were several repeated references by DON to that application on the Web site.

And, in fact, now that I recall, there probably is a letter where they critiqued the Tarawa Terrace model, or reviewed it. I don't mean critiqued it. But they reviewed the model, and they may have said something to that effect in that letter.

Q What is that letter called if I wanted to request it from Mr. Bain?

A It's the Navy's review of the Tarawa Terrace

model, and it's dated 2007 or '8, something like that. And we have -- we responded to that letter point by point on --

Q I remember.

MR. ANDERSON: Okay. Let's take a break.

(A brief break was taken.)

MR. ANDERSON: Okay. Let's go back on.

BY MR. ANDERSON:

Q Dr. Maslia, before we took a break, we talked about the -- some of the various chemicals that were combined -- chemical contaminants combined in the drinking water at Camp Lejeune. And when we listed those several chemicals, first of all, those were in the finished water that comes through a person's tap, right?

A That is correct.

Q And you mentioned that in addition to those there was also some benzene in that water.

A No. What I said was that we had two or three hits at the water treatment plant there. And I just could not say what happened to the benzene because it was such low -- low concentrations of it.

Q Based on the documents that the government gave you.

A That's correct, yes.

Q And if you found benzene at the water treatment plant, is there any reason to think it somehow gets taken out of the water once it leaves the treatment plant and flows to the consumer?
A No. It may have been diluted, though.
Q Right. Sure. And we don't know.
A That's correct.
Q And then you mentioned also that the study assumed no additional source of TCE on Tarawa Terrace. And just to be clear for the Court, the multi-species, multi-phase model in Appendix A2, when it includes TCE as an assumed breakdown product from PCE, that doesn't encompass if, in fact, there was another source of TCE like industrial solvents onsite.
A That is correct. That model, again, uses PCE as the source, the same value we use for the single species. It just let's it break down through the breakdown process.
Q So if it would be shown by the evidence and from its greater weight that there was actually TCE degreasing done on Tarawa Terrace, that would not yet be taken into account by the multiple chemicals you found in the water in your model.
A Another source of TCE was not -- a source,

not another one -- a source of TCE was not taken into account because we did not see any evidence of a source like there was for PCE.

Q And that, again, as with the benzene, was based on the documents that the government gave you.

A That is correct.

Q Now, who at the Department of the Navy asked that that Web site for the families to type in their addresses be taken down?

A It was just in general conversation. Again, we have monthly conference calls, and they also critiqued the Tarawa Terrace model, and I cannot put a name, that I specifically remember that person said X, Y, and Z, but that definitely Navy and/or Marine Corps staff expressed that sentiment.

Q That they expressed their displeasure with that Web site and asked that it be taken down.

A With that application.

Q Okay. The one that allowed family members to type their address in --

A Yes.

Q -- and find out how many chemicals they had.

A That is correct.

Q Now, you mentioned that the Department of Navy critiqued your model. You said that.

A That is correct.
Q They did that in writing, didn't they?
A Yes, they did.
Q And they sent that to you.
A Yes.
Q What is that document called, or how would I ask for it to get it from Mr. Bain?
A You could ask for it in two ways. One, you can see it on our Web site. We have our response to it. We have the ATSDR -- I think it's called response. If you go under the water modeling for Tarawa Terrace and go down through all of the publications and stuff, you'll see something to the effect of ATSDR response to the Department of Navy review of Tarawa Terrace model. And in that, we include their letter because we refer to certain sections of their letter. So you'll see their letter there.

And you could then see the date of their letter and just ask them for the date of that letter. And offhand I do not remember if they sent it directly to me or they sent it to Dr. Frumkin who was the assistant administrator of ATSDR at the time. I just don't recall that.
Q Who wrote that attack on your model?

MR. BAIN: Object to form.
BY MR. ANDERSON:
Q Who wrote it?
MR. BAIN: Objection.
THE WITNESS: The cover letter was signed by, I believe, Mr. Harrison.
BY MR. ANDERSON:
Q Is he part of the Department of the Navy?
A Yes.
Q Is he a scientist?
A He has a "PE" after his name, so I'm assuming he's a registered engineer. I really would like to look at the letter again, if I can see that. We deal with him and also Richard Mock who is his supervisor.
Q Do you have a copy of that with you?
A No, I do not.
Q Well, we can get it on this computer in a minute. The -- maybe at our next break so we're not wasting time. I'll dig it out with your assistance.
The critique of your model, was it -- that is the critique peer reviewed?
A Their letter or --
Q Their letter.
A I don't know. You would have to ask them.

Q Did you agree with their critique of your model?
A We disagreed with many of their points that they made in their letter, and we addressed each one.
Q Did you, as a result of going through that process, become convinced that there were problems with the work you had done on Tarawa Terrace?
A No. I was convinced even more strongly that we did a scientifically defensible work.
Q Why more strongly?
A Because we were able to, in addressing some of their critiques, point out where in the literature elsewhere these techniques had been used. And, in fact, some of the critiques that they provided, we were able to show that, in fact, at other locations the Department of Navy used the exact same approach that we had used and it was acceptable to the Navy at that location.
Q And did you point that out in your letter?
A Yes.
Q So that's available to me on the Web site?
A Yes. Yes, it is.
Q And those are the same methods and techniques that you utilized in your study.
A That is correct.

Q Going back now to the tables indicating the multiple chemicals to which people at Tarawa Terrace were exposed in their drinking water, I just want to talk to you for a second about the routes of exposure.

Given that these several chemicals are coming out of the tap, is it fair to say, based on your understanding, that people would be exposed to these chemicals through drinking, inhalation, skin absorption?

A Yes; all three.

Q So if somebody was living there on the base in base housing at Tarawa Terrace, they would be exposed whenever they drank, cooked, bathed, washed clothes.

A Yes.

Q And the routes of exposure would include not only the actual drinking of it but inhaling the volatile heated water, for instance, when you're standing in the shower and all that steam is in your face?

A Yes.

Q Or when the washer or dryer is running?

MR. BAIN: Object to lack of foundation.

THE WITNESS: I really could not answer that

specific question.
BY MR. ANDERSON:
Q Skin absorption when you're washing dishes --
A Yes.
Q -- and have your hands in the hot water, steam coming up, inhalation?
A Yes.
Q And best of your understanding based on the work you did, that would have been day in and day out, right?
A Yes.
Q Are these chemicals additive in the adipose tissue?
MR. BAIN: Objection; lack of foundation.
THE WITNESS: This is outside of my area of expertise.
BY MR. ANDERSON:
Q You don't know if they are bioaccumulators?
A No.
Q Do you know whether these chemicals are interactive, that is, whether vinyl chloride in the context of PCE interacts?
MR. BAIN: Objection; lack of foundation.
THE WITNESS: I have no expertise in that

area.
BY MR. ANDERSON:
Q So when it comes to just how toxic this chemical cocktail is, you couldn't say.
MR. BAIN: Objection for lack of foundation.
THE WITNESS: That's, again, outside my area of expertise.
BY MR. ANDERSON:
Q And you've talked now about the routes of exposure. What is your understanding about who was exposed?
A Anyone who was living in Tarawa Terrace housing, because the water distribution system provided water to Tarawa Terrace housing. So that would be, you know, children, adults, workers. In other words, if there's a restaurant or whatever on base or shopping center, people who -- you know, there is a swimming pool there. People who went swimming.
Q Marines?
A Yes.
Q Their wives?
A Yes.
Q Their children?
A Yes.

Q Pregnant wives of Marines?
A Yes.
Q Infants?
A Yes.
Q Pouring this water in an infant formula and so forth.
A I have no knowledge of the feeding practices back then. So --
Q Or through the breast milk.
A Yes.
Q Now, in terms of these tables, you know, now the DON has got that site taken down, and the families can't go on there anymore and type in their address. But they can get ahold of your study. And if they want to -- if they do find your study and want to read about their exposure -- let's just go to that, if you would, stress period 349 again, January of 1980, when Laura Jones -- actually February 1980, 350 stress period when Laura Jones came on base.
She could look and she could see her exposure to total PCE and then the other chemicals that you listed as breakdown products. For that month, you see under stress period 350, and she would know she had those exposures in that month. Is that how we read this?

A That would be her average exposure.
Q In that particular month.
A That is correct.
Q So each day of that month on average, she would have been exposed to that much of those chemicals; is that the understanding?
A No, no. I would say over a month period, the average exposure would be this value. We cannot go down -- the model does not go down to a day.
Q No, I understand that, Morris. But I'm asking -- what I'm asking -- I want to make sure that the record is clear. You're saying and you already told me it would be each and every day that this exposure occurs.
What I'm asking you is: You're saying here on average in February of 1980, she's exposed to these chemicals throughout the month.
A No, no. I'm saying the average exposure which is different than on average.
Q Okay. The average exposure per month.
A Yes.
Q Okay. So this is a monthly value?
A That is correct. That is correct.
Q Okay. So the average exposure per month for February 1980 is this series of numbers.

A That is correct.
Q Okay. And then let's say she stays for stress period 351. Then the next month the average per month is, she's exposed to the next set of values.
A That is correct.
Q And so on and so forth throughout the entire time she's there.
A That is correct.
MR. ANDERSON: Let's go off the record for a second.
(Brief discussion ensued off the record.)
BY MR. ANDERSON:
Q And just for final clarification on the issue of exposure, if there is another source of TCE, she would have been exposed to that in addition to what you have here.
A Not unless it got in through the water treatment plant.
Q Right.
A Okay. And, again, that really would be speculating based on here, because our model is based on only one source and that's PCE and degraded TCE.
Q Right. And that's the only one you know about.

A That is correct.
Q And if it were shown from the evidence that there was another source that got into the water, then that would be in addition to what is reflected?
A If it got into the supply well and then into the water treatment plant, then that would be an addition. But it would be -- you could not defend just taking that value and adding it to this model, because then the model would not have incorporated that other source. We would have to rerun the model to do that.
Q Understood. And the same would be true if there was a significant source of benzene. You would have to rerun the model.
A We would have to rerun the model with a caveat that if we could assume it was dissolved, low enough concentration, in other words, not floating above the water table but just dissolved like these were, then you could rerun the same model that we had. If, in fact, it is substantial enough that it's floating on top of the water table, then you have an entirely different complicated model. You could not use these models.
Q And if, in fact, you were running a model for TCE or PCE and you were about finished with the

model years into it and somebody told you, Hey, there's a million gallons of benzene that have not previously been accounted for, would that mean you would have to start a lot of work over?

A It means you would have to look at what assumptions the model that you have developed thus far -- what assumptions you have made and see if, in fact, you could include that, or, in fact, you would have to bring in a more complicated model.

You would have to evaluate that because benzene also has -- even if it's dissolved, it has different, what we would call, retardation factors, the speed or lack thereof that it moves once it's mixed with water. It would move at a different rate than PCE would. So you would have to rerun the model and take that into account, and there would be some time involved in doing that.

Q He's asking -- Mike Pangia wants me to ask you: If, in fact, there was found to be benzene in this water, does that mean that your -- the work you did and the model you ran is inaccurate?

A No, not at all.

Q Now, stepping back again from the data itself and so forth to the subject of your model more broadly with regard to Tarawa Terrace, did you check

the results of your simulations against any actual data points, that is, known data like you described doing in Georgia?

A Yes, we did.

Q Were they -- were your simulation results consistent or inconsistent with the known levels of contamination?

A We were very consistent.

Q What did that tell you?

A It told us that we had a reliable and, more importantly, what we believe is a scientifically defensible product.

Q All right. So that gave you added assurance of the accuracy of your results because of the fit between the study results and the known levels of contaminants.

A That is correct.

Q Were there any other checks on methodological reliability that you did after you had run your simulations?

A Well, Chapter I, which is the probabilistic and sensitivity analysis, is another check because, again, it demonstrated that the range of values were fairly narrow, were within acceptable limits for the epidemiologist to use. And we felt that they showed

that our results were consistent over time.
Q So that was another confirmation of the reliability.
A Yes.
Q And then you've already told us you had the study peer reviewed.
A Yes.
Q You mentioned that the Department of the Navy had criticized your study. Has the study been criticized by anybody else?
MR. BAIN: Objection to the form. The word used was critiqued.
MR. ANDERSON: All right. Well, I'm not going to get into that level of semantics.
BY MR. ANDERSON:
Q By whom?
A The National Research Council.
Q All right. Tell me about that.
A About the council or about --
Q About the criticism or critiquing of your model by the National Research Council.
A Okay. They produced a report in June of -- is it 2009 or 2010? I forget the year. And they spent an entire -- Chapter 2 is what they referred to as their exposure assessment chapter, and they spent

the entire chapter critiquing the modeling approach, the model that we used.

One of their biggest critiques that they made -- not only did we disagree with but the data contradict their critique -- is that we did not analyze the VOCs as DNAPL, which are dense non-aqueous phase liquids, which means they have a density of greater than one or they are denser than water. And they indicated that that was a severe limitation. That was one.

They also critiqued in a different chapter -- Chapter G, I think -- we do a vapor analysis, look at the vapor of the different constituents going into the soil above the water table. And they critiqued that by comparing it to vapor intrusion in a dry cleaner in New York City. And, again, we were baffled as to why they would compare soils, sandy limestone soils in North Carolina with an urban dry cleaner in New York, but that's the comparison they made. And, again, we addressed all of their -- internally we addressed all of their critiques. But they critiqued it.

Q When you addressed these internally, were there documents generated that -- where you addressed these critiques?

A I generated a document and sent it to my branch chief and division director as an e-mail attachment.

Q Who is that person?

A My branch chief is Susan Moore, M-o-o-r-e; and my division director is Dr. William Cibulas, C-i-b-u-l-a-s.

Q And so you attached that response to the National Research Council and gave it to your superior.

A That's correct.

Q How did you deal with the issue of your supposed failure to treat the contaminants as dense, nonaqueous-phase liquids?

A Well, in fact, they used data that we published in Chapter E, which is the water quality chapter. And I think the highest value was 20,000 micrograms per liter. And what we said was, all that is is an indication of a source but there's no other data anywhere near there and so they could not prove that that was DNAPL. In other words, that does not prove there's DNAPL there. And so they used the data that we published.

That was one of our -- if you want to call it -- complaints about -- internally our senior

leadership is that they took data that we published, misinterpreted it, and then put it out there for the public as scientific gospel, because they are the National Research Council.

Q Who are they anyway? I mean, you know, who are those people?

A National Research Council is an independent agency that is contracted out by any -- typically by any agency within the U.S. Government. If they want, you know, high-level scientific work or analysis, they do many types of different analyses.

Q So they are paid for hire, available to be hired by some agency, for instance, the Department of Navy?

MR. BAIN: Object as to form.

THE WITNESS: The Department of Navy did pay for the National Research Council review. My understanding is that they were mandated to do so by Congress in one of the defense authorization bills.

BY MR. ANDERSON:

Q Do you know who introduced that --

A No, I don't.

Q -- amendment to the legislation?

A No, I do not.

Q That's interesting. In expressing your concerns internally about the fact that, as you put it, the DNR -- or DRC -- excuse me -- let me start over.

In expressing your concerns here internally about the fact that the National Research Council had, in your words, misinterpreted our data and represented it to the public as scientific gospel, did you and others within the ATSDR write e-mails and memos about that subject, discussing it?

A We wrote a formal -- at my level, response. I did it for my particular chapter of interest which is the Chapter 2. I know Dr. Bove did the toxicology and epidemiology. And, like I said, I sent mine by e-mail. But we had numerous discussions with agency leadership -- at that time, Assistant Administrator Dr. Howard Frumkin and Deputy Director Dr. Tom Sinks -- and we were told on several occasions in no uncertain terms that the agency would not respond the NRC report.

Q Why?

A They said these were scientists of national repute, okay, and that the agency was not going to respond to the NRC report.

Q So you were ordered not to respond.

MR. BAIN: Object as to form.
BY MR. ANDERSON:
Q Were you ordered not to respond?
A I was told the agency would not respond.
Q Did you have any choice? Did you have a choice to respond anyway?
A I wrote -- I wrote my document and sent it by e-mail to my branch chief and division director, and that's as far as I could go --
Q So if you --
A -- as an employee of ATSDR.
Q So the public only sees one side of the story. They see what the National Research Council has misinterpreted from your data --
MR. BAIN: Object as to form.
BY MR. ANDERSON:
Q -- but they don't see your response; is that the truth?
A The public has not seen my response as an official ATSDR response to that section of my expertise in the NRC report.
Q How about Bove's response to the NRC's toxicology stuff: Has the public seen that?
A No, they have not.
Q So the public has seen one side of the story

and not your side of the story?

MR. BAIN: Objection as to form; argumentative.

BY MR. ANDERSON:

Q I'm just asking: What is the truth? Is that the truth?

A Our internal scientific response to the document -- both epidemiology, toxicology, and exposure assessment -- was not released -- were not released as ATSDR responses to the NRC report.

Q Were they released in any form to the public?

A The agency did release a -- if you want to call it a work plan, okay, or a plan going forward. And in it, they did not subscribe to all of the NRC's recommendations. Okay. In other words, however, we always felt from the technical and scientific standpoint that that significantly watered down our work because it did not, you know, go point by point. But the agency did put forth a plan going forward in which the agency did not accept all of the recommendations of the NRC.

Q And I believe you said that the NRC misinterpretation was funded by the Department of the Navy?

A The NRC work -- the work the NRC interprets or cites, there's a committee there, and they do what they do to get the ball running. In other words, to get funding to look at the water contamination at Camp Lejeune, that product was -- my understanding -- was funded through authorization in one of the defense authorizations.

Q And that was by the Department of Navy, right?

A I'm not clear if it's the Department of Defense or Department of Navy. In other words, I don't recall specifically.

Q One or the other or both.

A Right, that's correct.

Q When you read what the National Research Council had come up with about your model, did you come away from that feeling that your model was invalid in some ways, or did you come away from that convinced of your model's validity?

A Neither. I was convinced there was significant misunderstanding and misinterpretation of information and, in fact, lack of understanding of the whole Camp Lejeune issue on the part of the NRC committee and specifically those people on the committee who were responsible for doing, say, the

exposure assessment part.

Q Why do you say that?

A I had several e-mails back and forth from one particular individual on the committee.

Q Who was that?

A Dr. Prabhakar Clement. Last name is C-l-e-m-e-n-t. And I think he's out of Auburn University. Early on when -- in 2007, 2008, asked me -- asking me about what -- what particular approaches we were using and, for example, how we were treating the PCE source and the model, what option in the model we were using. I'm putting this in layperson's terms, if that's okay.

Q I appreciate it.

A And I explained and all of that. And, in fact, I have an e-mail from him saying, Boy, this is great. You know, the public is lucky to have an agency like -- ATSDR is doing such a good job and all that sort of stuff.

And then somewhere along the line in 2008, 2009 -- it was after we published these results for Tarawa Terrace -- I didn't hear anything, but then the NRC came back. And it was like totally opposite of what we had been communicating in an e-mail, and I wasn't sure where the change -- and, of course, the

reports -- a committee report. And somewhere in -- I think it was 2008 or so -- I had sent an e-mail to the chair -- oh, not the chair of that committee but the NRC staff person who oversees the committee.

Q Who is that?

A Susan Martel.

Q M-a-r-t-e-l?

A M-a-r-t-e-l. Susan.

Q Okay. Keep going.

A Suggesting that it would be good for the committee or for us to meet with the committee again because I thought there were political budget and scientific issues that perhaps the committee needed more clarification on.

And so I sent her that e-mail. We met once with the NRC committee. They had a public meeting in Washington. I forget the date of it. That's public record. And, you know, I presented a 20-minute presentation of what we were doing with Florida modeling. Dr. Bove presented 20 minutes on the EPI side. The Marine Corps -- one Marine Corps general -- I do not recall his name, but I have got the -- there's a an agenda of who spoke -- got up and stated what the Marine Corps was hoping to get out of the NRC committee and all of that sort of stuff.

And so the rest of it -- that's the only time we presented details of what we were doing. The rest of these are through e-mail requests of the results or whatever or data that we had. And, as I said, as things progressed, I felt that the -- I felt personally or professionally -- professionally that the -- it was a lack of understanding, as I said, of the politics, the complexity, budget issues, and approaches that we were using and that it would behoove the committee just to hear from ATSDR on those subjects. And I sent that e-mail to Susan Martel.

Q What was the response?

A Her response was that she would forward my e-mail to the chair of the NRC committee but it would be up to the chair of the NRC committee to make a decision if they wanted additional information from ATSDR or additional -- I don't know if it's called testimony or not but, you know --

Q And what happened after that?

A Nothing.

Q You mean, you -- so you never heard back from the chair of the --

A No.

Q -- NRC?

Who was it that told you that the rebuttal that you had produced to the NRC interpretation could not be made public?

A We were told that ATSDR was not going publicly rebut, and that was Dr. Sinks, Dr. Tom Sinks, as well as my division director and the division of health studies director, which is Dr. David Williamson. They are obviously one level bureaucratically below Dr. Sinks.

Q So he was the top man responsible for that decision?

A I couldn't say if he was personally responsible or not. I'm not involved in those discussions at that high level. But he was the -- at the time, assigned to oversee the whole Camp Lejeune health study, and that's what we were told on several occasions.

Q The question that comes to mind is this, you know, the government spent a lot of money to allow you to do the study that we have talked about, and it's printed in these beautiful reports. First of all, how much money -- how much money did your study cost?

A It's been averaging about 1.5 to 1.8 million per year.

Q How long has it been going on?
A Since 2004.
Q So the -- and the government is paying for that, the taxpayers are paying for that study, correct?
A That is correct.
Q So the government -- help me understand -- the government spends many millions of dollars to support your work because you guys are the experts.
A That is correct.
Q And they fund you. And now the Department of the Defense or the Department of the Navy comes along and gets another organization. This -- uses another organization also funded by the government, funded by the taxpayers, to attack the work that you did, funded by the taxpayers, right?
MR. BAIN: Object to form.
Q Is that true?
MR. BAIN: Objection.
THE WITNESS: They used another scientific body to critique our work. That's fine. And our work is public information, so anybody can critique it, whether it's an individual or consulting company or any other organization. I believe it's scientifically defensible. And what

I asked for and what my colleagues at ATSDR and, in fact, our cooperators like Georgia Tech requested, that we be allowed to defend it on the same playing field.

BY MR. ANDERSON:

Q And that was the request that was denied.

A That's correct.

Q I mean, you know, just kind of simplistically, if, say, Toyota did this, you know, they fund a study of their gas pedals and then they hire -- they also fund a study to critique their study of their gas pedals, that would be nonsensical.

How does it make sense that we're paying, as taxpayers, for a multimillion dollar study by you guys who are the experts and then we're also paying for the National Research Council to come along and critique that? How does that make sense?

MR. BAIN: Object to form; lack of foundation.

THE WITNESS: I haven't got an answer for that.

BY MR. ANDERSON:

Q In reviewing the documents that cover the known data regarding the actual contamination that were provided to you by the Department of the Navy,

were you relying on the Department of the Navy to provide you with everything that they had?

A Yes.

Q And what documents did you see?

A We saw anything from handwritten notes to lab reports to engineering reports to remedial investigation reports to unidentified slips of paper.

Q Did you see these documents that were attached to our lawsuit. I'm going to show you exhibit pages E, F, G, also known as CLW4306, 438, 443. Did you use those as known data points?

A These are -- actually what these are -- CLW, we have termed -- and it's in our reference section as Came Lejeune water document, and they are all listed, not necessarily in sequential order, all in the DVDs.

Q Right.

A And what these particular ones -- let's looks at CLW0436. At the time, this is 1980. And this is how the volatile organic compounds were actually discovered at Camp Lejeune. Because at the time they were looking for trihalomethane constituents, and that's what's listed here: CHCL3; CHCVR is the bromide; and so on and so forth. Because they were -- these were byproducts of --

disinfection byproducts, and they were concerned about high levels. And so they --

MR. BAIN: Excuse me. You got to listen to his question, and answer. He's just asking you if you saw these and used these.

THE WITNESS: Oh, okay, okay. Well, I was getting to why we did not -- sorry -- it's elongated -- why we did not use as data in our model. So the answer to your question, we did not use these particular documents as data in our model.

BY MR. ANDERSON:

Q Okay. Go ahead and tell me why not, just in the interest of hearing that.

A Because they relate to trihalomethanes and this is infection of byproducts. They do not relate to volatile organic compound contamination. However, they were having difficulty with the analytical methods in there, and they had indicated possible or likely VOC interference.

Okay. So while it does not give us a value to put in or compare the model with, it does tell us that in 1980 there were most likely high levels of VOCs in the water. And, in fact, the model confirms from a quantitative standpoint. So we used them

indirectly in our model.

Q And they were consistent with what you found.

A Yes.

Q Okay. And I guess that document, that first one there, says: Water is highly contaminated with low molecular weight halogenated hydrocarbons of strong interference, et cetera, et cetera.

Do you know who prepared these documents, these -- I guess it says William Neal, chief of laboratory services.

A It was prepared by the laboratory section of Camp Lejeune. And Elizabeth Betz was a chemist whose name you will see many times on such documents.

Q So these documents in 1980, which you indicate reflect high levels of volatile organic compounds in the water, also reflect an awareness, a knowledge, on the part of the Department of the Navy's staff, Marine Corps staff, of the presence of those chemicals as of that time; is that true?

A Let me put it this way: I don't know how the Department of Navy handled its internal communications. They indicate that a lab analysis was done and a chemist provided an information sheet to someone in their environmental management

division. That's all I can say from that document and their repeated references to interference with VOCs.

Q Right. But, I mean, these documents -- CL436, 438, and 443 -- based on your knowledge, your training, and your experience, these were documents generated by the Department of the Navy.

A No, no.

Q Or the Marine Corps.

A Marine Corps.

Q Right there at the base --

A That is correct.

Q -- in 1980.

MR. BAIN: Do you want to look at all of the pages that he referenced to see --

THE WITNESS: Yeah --

MR. ANDERSON: Yeah, and then give me the answer after you look at them all.

THE WITNESS: Yeah, these are -- these are all part of the CLW documents. CLW number was put on subsequent to -- probably during the time that we started our health study. These particular documents were prepared locally at Camp Lejeune.

BY MR. ANDERSON:

Q And so they're government documents; they're documents of the United States Government?
A Yes.
Q An agency of the government.
A Yes.
Q Is the Marine Corps a part of the Department of the Navy?
A Yes.
Q And just to come back to my question because it got a little interfered with, ironically, those documents reflect that the Marine Corps knew as of 1980 that there were high levels of volatile organic compounds in the water at Camp Lejeune.
MR. BAIN: Object to form; lack of foundation.
BY MR. ANDERSON:
Q Isn't that the truth?
MR. BAIN: Same objection.
THE WITNESS: The chemist and the person that she provided these documents were made aware of it.
BY MR. ANDERSON:
Q They knew it.
A Where it went -- I mean, I cannot speak for the entire Marine Corps or the Navy.

Q But some agent of the Marine Corps knew as of 1980 that there were high levels of volatile organic compounds in the water.

MR. BAIN: Object as to form and lack of foundation.

BY MR. ANDERSON:

Q Answer?

A They -- they were told that there was interference with their mass spectrometer on there.

Q Did you tell me before that this indicates high levels of volatile organic compounds?

A High level of VOC that's interfering with an analytical test. It is not a direct confirmation that there are VOCs in the water.

Q But it ended up being consistent with what you found.

A That is correct.

Q Which was high levels of VOCs in the water.

A That's correct.

Q So some agent of the Marine Corps knew in 1980 that there were high levels of VOCs interfering with their samples at Camp Lejeune.

A That is true.

MR. BAIN: Object as to form and lack of foundation. The document speaks for itself. He

wasn't --

MR. ANDERSON: Let's have him testify here. I want this on the record.

BY MR. ANDERSON:

Q Is that the truth, sir?

A Could you repeat the question.

Q Yeah, yeah. Some agent or agents of the Marine Corps working in their lab in 1980 knew from these documents that there were high levels of volatile organic compounds in the water interfering with their sampling.

MR. BAIN: Object as to form and lack of foundation.

Go ahead and answer it.

THE WITNESS: That is correct.

BY MR. ANDERSON:

Q That's is the truth, isn't it?

MR. BAIN: Objection, same objection.

BY MR. ANDERSON:

Q Simple.

A I wouldn't phrase it as truth or not. I'd say the facts based on those --

Q All right. That's the facts.

A That is what those sheets or those lab results are showing. That is that chemist's

interpretation.
Q An interpretation which was subsequently borne out by what you studied and what you concluded.
A That is correct.
Q And peer reviewed.
A That is -- yes, it was peer reviewed, yes.
Q Did you also review the Grainger report from August of 1982 in connection with the review of the known data points?
A Yes.
Q And was that one of the data points that you use as a check on your simulation?
A Yes.
Q And were those data points consistent with what your simulation discovered?
A Yes.
Q And it indicates here Bruce Babson had prepared that Grainger report and sent it to the commanding general of Camp Lejeune.
Did I read that correctly?
A That's how all we even address things to the commanding general.
Q Did I read it correctly?
A Oh, yeah, you read it correctly. It says it's sent to the commanding general.

Q Does this document also indicate that, again, now, two years later, the Marine Corps is aware of high levels of volatile organic compounds in the drinking water at Tarawa Terrace and now even the quantities of some of these?

A Yes.

Q Did you see documents contemporaneous to this document indicating any knowledge on the part of the Marine Corps of the health risks associated with exposing the Marines and their wives and children to these chemicals at that time?

A The Grainger letter in the first paragraph or second -- I don't have it in front of me, so --

Q Now you do.

A Okay. Thank you. Yeah, what I said -- what brought this particular letter to our attention is their statement in there basically stating that the Marine Corps should not be so much concerned with the earth environmental issues but with the health issues, because it said in here, these appeared -- meaning the concentrations of the -- albeit high levels -- and, hence, more important from a health standpoint than the total THM content. Okay?

And so that's what caught -- from both my standpoint and the epidemiologist's standpoint is

that the -- a lab -- I assume this is a contract lab to the Marine Corps -- had informed them of in the first paragraph of that.

Q Of the health risks; is that right?

A Well, the health concerns. They did not quantify. We tend to talk in terms of risks in quantifiable numbers. They did not quantify that, so I would say that's, you know, health concern.

Q Right. And they said that the interferences which were thought to be chlorinated hydrocarbons hindered the quantification of certain trihalomethanes: These appear to be at high levels and, hence, more important from a health standpoint than the total high trihalomethane content. For these reasons, we called the situation to the attention of Camp Lejeune personnel.

Is that what we're talking about?

A That's what I just read from.

Q Okay. So bottom line, again, here, the folks at Camp Lejeune are being put on notice that not only are there high levels of volatile organic compounds in the water but that these raise human health concerns?

A That is how we interpreted -- or interpret that.

Q All right. And I just want to put these documents into the record so that the record is complete.

(Plaintiff Exhibit Numbers 3, 4, 5, and 6 were marked for identification.)

BY MR. ANDERSON:

Q I'm going to put in as Exhibit 3 the CLW436; Exhibit 4 to your deposition, CLW438; Exhibit 5 to your deposition, CLW443. And Exhibit 6 is a two-page document, CLW5177 and 5178, the Grainger report, G-r-a-i-n-g-e-r.

And you mentioned Elizabeth Betz. And in August of 1982, she, in the course of reviewing the Grainger letter that we just saw, remarked, did she not, on some of the health -- human health effects of exposure to this group of chemicals?

A I need to look at the particular document.

Q Who was Elizabeth Betz?

A She was the base chemist. That's how I refer to her. I don't know her exact title. Okay? But that's in the documents that I've seen. She was always dealing with the water quality analyses.

Q She worked for the Marine Corps and was an employee of the United States Government?

MR. BAIN: Object to form; lack of

foundation.

THE WITNESS: I really could not say. I've just seen her name on internal Marine Corps documents. I do not know if she was a contract employee or a civilian government employee.

BY MR. ANDERSON:

Q Okay. But in whatever specific capacity she worked, she was working on behalf of the Marine Corps, correct?

A That is correct.

Q And she was working over there at the base, from what it looks like in these documents.

A That is correct.

Q And she in August 1982, showing you Exhibit 7, remarked upon the health risks to human beings of exposure to some of these chemicals that you found were, in fact, in the water and that the Grainger report had found in the water.

A That is correct.

Q She found things like liver damage, kidney damage, central nervous system disturbances in humans, correct?

MR. BAIN: Can you refer where you're referring.

MR. ANDERSON: Paragraph 5.

THE WITNESS: That's what she reports and reports about, suggested guidances and things of that nature.

BY MR. ANDERSON:

Q So the answer was yes?

A She stated what she -- I mean, what she states in the letter is what she stated.

Q Well, she, working on behalf of the Marine Corps in 1982, stated in her report that these chemicals can cause in humans liver and kidney damage and central nervous system disturbances, correct?

A That's what she says in here.

Q Do you know of anything that would refute that, say that is not true?

A You would have to ask a toxicologist.

Q And then that, for the record, was CLW606 and 607, which is now Exhibit 7.

(Plaintiff's Exhibit Number 7 was marked for identification.)

BY MR. ANDERSON:

Q So this, again, reflects, you know, in 1982, the knowledge of at least some agents over there at the Marine Corps, of the risk of allowing families -- children, infants, neonates -- to be exposed to these chemicals, doesn't it?

MR. BAIN: Objection to form.
THE WITNESS: Again, it expresses their concerns --
BY MR. ANDERSON:
Q All right.
A -- of health risks, but it does not quantity the risk.
Q Right. They knew there was a risk.
A I would say that's correct.
Q When you reviewed the documents that you reviewed from the time that these people knew there was a risk and knew there were volatile organic compounds and knew they posed a threat to human health, from that time forward, did you see any evidence that the Department of the Navy or the Marine Corps took action to protect the Marines and their families from these contaminants?
MR. BAIN: Objection to form.
THE WITNESS: We were not reviewing the documents to assess what the Marine Corps did or did not do. We reviewed documents to see if they contained pertinent or relevant data or information to use for developing the water -- from the water model.
BY MR. ANDERSON:

Q Did you review a lot of documents?
A Yes.
Q In the course of your review, did you happen to see any documents that showed what action showed them taking action to protect the families?
A There were some memos where there were instructions on how to operate the distribution system.
Q When were those memos?
A I would say around 1985 or so.
Q So five years after the -- Exhibit 3 and three years after Betts's acknowledgment of human health effects.
A Be approximately correct.
Q Did you, in the course of reviewing all of those thousands of pages that your -- that you reviewed, find the Department of the Navy or the Marine Corps taking any step in those intervening years to protect the Marines and their wives and children from these chemicals?
MR. BAIN: Object to form.
THE WITNESS: There were internal memos about replacing certain wells and not operating certain wells.
BY MR. ANDERSON:

Q In '85.
A Again, right around '85.
Q I'm asking you before that. Between 1980 and '85, did you see them take steps, action -- take action to protect the families?
MR. BAIN: Objection to form.
THE WITNESS: I really did not review the documents for what action, again, the Marine Corps took. But, rather, did it provide -- in other words, if they were to take an action where they were to turn on a well or turn off a well, that would have implications for the water --
BY MR. ANDERSON:
Q Right. And you told me that happened in '85.
My question is: Do you know -- can you tell me any action that you know of that the government took to protect the people -- the wives, the children, the Marines -- from this water and its contaminants between 1980 and 1985? Do you know of any?
MR. BAIN: Objection to form; asked and answered.
MR. ANDERSON: It's not been answered.
BY MR. ANDERSON:

Q I want to know what you know --
MR. BAIN: He's answered it.
BY MR. ANDERSON:
Q I want to know if you know of any action that they took to protect the families.
MR. BAIN: He answered it. He didn't review it for that reason. That's what he answered.
MR. PANGIA: Does that mean he doesn't know?
MR. BAIN: He's already answered the question.
THE WITNESS: Again, I reviewed the documents to see particularly, as an example, did they turn a well on and off and when did they do it. We did not have any indication if a well was in existence, that they turned it off, except for maintenance, in other words.
BY MR. ANDERSON:
Q Okay. So let me come at it from that standpoint.
Did you see where after they knew that this water was highly contaminated and they knew about the risks to human heath, that they shut the contaminated wells down and didn't let anybody drink any more of it? Did you see that?
A At '85 and afterwards, they shut down the

wells.

Q But what about in '81: Did they do it then?

A No.

Q Did they do it in '82?

A No.

Q Did they do it in '83?

A No.

Q Did they do it in '84?

A No.

Q So all of those years, based on what you know, the families were drinking this highly contaminated water.

A Water contaminated with volatile organic compounds that we described in our analyses were, in fact, being delivered to the residential housing and other locations at Tarawa Terrace.

Q Did you review the BUMEDs, B-U-M-E-D-s?

A I know what they are. Only after they were brought to our attention in a congressional hearing June of 2007, I believe, June 13th.

Q That was the first time you became of aware of that.

A Yes.

Q Did you learn of the base order at that time with respect to the water?

A Yes.
Q But not before.
A Not before.
Q What did they require?
MR. BAIN: Objection as to form; calls for a legal conclusion.
BY MR. ANDERSON:
Q You can answer.
A I did not review the BUMEDs in detail. We felt they were, for the water modeling, not pertinent because they spoke about water quality onboard ships, and also some of the levels or standards that they described in there having to do with pesticides and things of that nature that we were not analyzing for.
And so we -- again, we reviewed documents to extract data and information specifically to develop and calibrate the groundwater flow and fate and transport model. And they were brought to our attention after we had concluded that. And we looked at them and said that does not change the results or, in fact, the assumptions of our model.
Q All right. They had to do with keeping the water from having contaminants, didn't they?
A That is correct.
Q During those years that they kept pumping

this water to the Marines and their families there at Tarawa Terrace, did the government -- did you see anywhere where the government gave notice to those people that they were drinking water that had these contaminants in it?

A There's a CLW document -- and I do not recall the number on it -- from, I believe, the base commander, and I think that was in 1985 where they were having water shortage. And going over how they were going to conserve water. But assured residents that there were only minute or trace amounts of contaminants in the water and it was safe to drink.

Q And that wasn't true, was it?

A There were not minute amounts in the water.

Q And that document is Exhibit 8, isn't it?

A Yeah. This is the one I'm thinking of, yes.

Q And he told him, Go ahead and drink it and go ahead and swim in it.

A And this was actually just for the record, because I don't see a CLW document. This is one of the CERCLA administrative records files, and I'm trying to see the number on it. But it doesn't have a CLW stamp on it, but there's probably a similar one with a CLW in these documents. But looking at the number on top, I can tell you that's a CERCLA

administrative record file.
Q And that's the document you were talking about.
A Yes.
Q And told them, Go ahead and drink it and go ahead and swim in it.
MR. BAIN: Objection as to form. The document speaks for itself.
BY MR. ANDERSON:
Q These are minute quantities.
A It was minute quantities that caught our attention. I think they used the word "trace amounts."
Q And that caught your attention?
A Yes.
Q Why?
A Well, to us, a trace amount would be less than the MCL which would be less for PCE, less than 5 micrograms per liter.
Q So that document is not accurate, is not true.
MR. BAIN: Object as to form.
THE WITNESS: It contradicts what has been -- what was measured, and it contradicts what the model shows.

BY MR. ANDERSON:

Q And it even contradicts the Grainger report, doesn't it?

A It does, yes.

Q Which was three years before.

A That is correct.

Q Other than that misleading notice that you indicated was given in 1985, Exhibit 8, did you, in your review, see anywhere during those intervening years that the government was sending this poisonous water to the people any notice of the true situation?

MR. BAIN: Object as to form.

THE WITNESS: I do not recall any -- any documents that I have -- I have reviewed or my staff have reviewed to that effect.

BY MR. ANDERSON:

Q Now, I understand that there was a memorandum of understanding -- I believe it was in 1991 -- between the ATSDR and the Department of the Navy so that the ATSDR would have access to all of the relevant documents for its water model.

Is that my --

A That is correct.

Q Did the ATSDR rely upon base personnel to provide all of the relevant documents?

A Yes.
Q Did the ATSDR ever have trouble getting information out of the Department of the Navy or the Marine Corps?
MR. BAIN: Object to lack of foundation.
MR. ANDERSON: I'm just asking.
MR. BAIN: Well, you haven't established that he speaks on behalf of the ATSDR.
MR. ANDERSON: Come on.
BY MR. ANDERSON:
Q Did you ever have trouble getting documents from the Marine Corps or the Department of Navy?
MR. BAIN: Can you limit it to him, then?
MR. ANDERSON: Okay.
BY MR. ANDERSON:
Q Are you aware -- I'm not going play games -- are you aware of the ATSDR and its agents, to include yourself, having any trouble getting documents you needed to do your work here from either the Department of the Navy or the Marine Corps?
A We have had difficulty in the Marine Corps and Navy identifying documents that we need.
Q Tell me about that.
A We have provided -- since we became involved in the health -- with the health studies in the

summer of 2003 and forward -- the types of data and types of documents that we needed, we have requested inventories or a list. And when we specifically identify, for example, we want a lab report by a certain name, then they will go and look for it. Okay?

But if -- in our general -- our approach is to say -- since they are the experts with their documents and not us -- we want documents for geohydrology, water quality documents that anybody who is trained in environmental engineering or dealing with base documents in their environmental management program, that we believe should know what those are. We have had difficulty and -- until we have specifically identified we want X, Y and Z of obtaining those documents.

Q Has there been correspondence about those difficulties?

A Yes.

Q Is it correct that you maintain a file of e-mails and letters that you've sent trying to obtain information you needed for your studies?

A Yes.

Q What would that file be called?

A Well --

Q How would we describe it to request it?
A I have e-mail files specific to underground storage tanks, okay, because that one I have specifically put together because that has come up most recently. And also the fact that the agency is going to a different e-mail system, I thought I'd better preserve it in a different way.
And so I have a chronology of e-mails back and forth to the Marine Corps, requesting these types of documents. In this case it happened to be underground storage tank documents and information.
Q All right. And you -- have you maintained also other documents relating to request for information that didn't have to do with simply the underground storage tank issue?
A Yes. There are official letters wherein the head -- or Dr. Frumkin or Dr. Sinks have written letters to their equivalent, which would be the -- like deputy or assistant commandant of logistics and installation at Marine Corps headquarters, and we would present what information we were looking for. We would say, What happens if we don't get the information? And there are a series -- or two -- two, you know, back and forth; our letter, their response, our letter, back and forth.

Q Have you got copies of those?
A Yes, I do.
Q Let me show you -- this problem of getting information from the Department of the Navy and the Marine Corps goes back quite a ways, doesn't it?
A Yes, it does.
Q The memorandum of understanding was found in 1991. I'm showing you one document that I just pulled out as an example from 1994. Reading from the second full paragraph, it says -- second sentence says: You are aware we have had much difficulty getting the needed documents from MCB Camp Lejeune. We have sent MCB Camp Lejeune several requests for information. And in most cases, the responses were inadequate, and no supporting documentation was forwarded. For example, ATSDR does not have any of the remedial investigation documents.
Did I read all of that correctly?
A That's correct.
Q It goes on to say: The situation -- and this is the last sentence of that paragraph: The situation at MCB Camp Lejeune is also somewhat complicated, in that several of our public health request questions could not be answered with information from the RI reports, for example, lead in

the drinking water.

Did I read that correctly?

A That's correct.

Q And then the next paragraph, the second sentence: For an ATSDR public health assessment to be useful, it is important that all pertinent information be provided for evaluation.

Is that correct?

A That's correct.

Q And we must rely on the base personnel to identify and provide the documentation; is that correct?

A That's correct.

Q Do you agree with those statements in this letter, Exhibit 11.

A I was not at -- well, that's 1994. I was at ATSDR, but I was not involved in any way with Camp Lejeune at the time.

Q All right. But you know that these problems with getting documents from the Department of the Navy and the Marine Corps continued, don't you? You know those problems continued.

A We had similar requests in the tone or verbiage in the letters that we officially wrote -- I say officially, meaning our agency leadership

wrote -- contained a similar message to this.

Q And those are the letters that you have in that file of yours.

A That's correct.

Q And I misspoke before. I described this as Exhibit 11. It was actually Exhibit 10. I'm going to show you Exhibit 11 which is another letter probably in that file of yours, December of 2005.

(Plaintiff's Exhibit Number 11 was marked for identification.)

BY MR. ANDERSON:

Q This is to the Department of Navy, Lieutenant General Kramlich. I'm reading the first paragraph. It says: The Agency for Toxic Substances and Disease Registry is conducting an epidemiologic case control study of the children whose mothers were pregnant while living on base. ATSDR staff briefed Lieutenant General Kelly and other headquarters Marine staff on the status of the study, including the water modeling, in August 2005. The purpose of this letter is to seek your assistance in resolving outstanding issues that delay ATSDR's ability to complete the current health study on time. ATSDR has experienced delays in obtaining requests for information and data pertaining to water quality

sampling data and site remedial investigation reports. ATSDR has recently been made aware of the existence of a substantial number of additional documents previously unknown and not provided to ATSDR staff. These documents are designated as CLW documents.

Did I read that right?

A Yes. I wrote the letter.

Q Oh, I'm sorry.

A I drafted the letter.

Q Right. It was signed by Frumkin.

A Yeah, but I drafted the letter.

Q All right. Fair enough.

So you were well aware of these problems.

A Yes.

Q So am I to understand that as of December of 2005, you had not been provided the CLW documents?

A We had not been provided some of the CLW documents, or we had not been provided all of their CLW documents. We had been provided some of them.

Q But not all of them.

A But we were aware, from making trips to Camp Lejeune and some inventory that they were doing, that I had noticed that we had not -- we did not have in our possession some additional CLW documents that

some went on base and shown me.

Q A substantial number. That's what you wrote.

A Yes.

Q Who on base showed you the additional -- the existence -- who revealed the existence of the additional CLW documents in 2005?

A It was not -- when you say "revealed the existence," we really did not operate in that manner. We would come up there occasionally. And I was up there in November 2005, and they were inventorying. They were inventorying the base, and they were showing me the CLW documents that were had, because I raised the issue at a meeting, asking if their inventory company was going to inform us of any water-related documents. And that's when I found out that they had this whole listing or drawing, if you want to call it, of CLW documents.

And I could tell by the numbers that they had shown me in 2005 that they had exceeded the numbers, the CLW numbers, that we had in our possession at ATSDR. And so that's when I expressed my concern to both my division director and our agency leadership, concern that we might -- those additional documents might contain information that

we were calibrating the model with and not be aware of.

Q Who at the base was present when you found out about that?

A That was Scott Williams.

Q Scott Williams. And where does he work?

A He's assigned to Marine Corps headquarters. He's our point of contact at headquarters, and that's currently.

Q And you said that there was something about the numbering that let you know that there were documents that had not been provided to you.

Do you recall how high your Camp Lejeune water documents went to, Bates-number-wise, before you got the additional documents in 2006?

A I seem to recall that ours went up to the 3,000s, and I had seen documents when I went on base in the four, five, six, and seven thousands. Again, we recognized they were not sequential. I think that's important to say. But all I knew is that they were not document numbers I had ever seen before.

Q And you mentioned that there were a substantial number missing. That would be in the order of thousands of pages, wouldn't it?

A Potentially, yes.

Q Well, I mean, in fact, you later found out it was on the order of thousands of pages.
A Yes.
Q And that was a discovery you made in 2005, years after your water model had begun on Tarawa Terrace.
A Our water model had -- it was probably in the -- probably been going on for about a year and a half.
Q This is the end of 2005.
A Right, right. We did field testing for a good part of 2004, from the spring through the fall of 2004, and did not really begin water modeling activities until 2005.
Q And these documents that had not been provided previously, they were actually stamped "CLW" for Camp Lejeune water?
A Yes.
Q Would it be too simplistic to say that in all likelihood something called a CLW, Camp Lejeune water document, might well be relevant to a Camp Lejeune water model?
A Would be pertinent, yes.
Q You went on on the second page to talk about the fact that you needed all documents immediately.

Did I read that correctly?

A We requested timely sharing of these documents.

Q "To attempt to meet our project completion timeline, we must be provided all documents that relate to base-wide water issues immediately." First full paragraph.

A Oh, okay. Okay. I mean, I wrote -- drafted the letter, so yes.

Q And that was true.

A That is correct.

Q You indicated that discovery of this documentation must not rely on specific requests from our staff but on our shared goal of ensuring the scientific accuracy of our study and DOD's responsibility to provide the information.

A That is correct.

Q You went on to say that a thorough review and assessment of such a large volume of additional documents at this late date and the incorporation of related information into a nearly complete model may require additional funding to review these documents and modify our model if necessary.

Did I read that correctly?

A That is correct.

Q "Completion of this assessment and required modifications to our model extend the timeline for six months to a year."

A That is correct.

Q Have there been additional problems getting documents from the Department of the Defense and the Marine Corps since then?

A It would be similar of the identification issue. When we specifically mention a document number or document type, they will provide it. But if we say we need -- as we did, you know, just underground storage tank documents, it -- the process is elongated.

Q So the answer is, yes, there have been continued problems.

A Yes.

Q A lot of those problems had to do with the underground storage tanks and the benzene; is that correct?

A That is correct.

Q I thought that the Department of the Navy and the Marine Corps were supposed to be a partner. You were supposed to be partners.

A We are partners. That's the purpose of the memorandum of understanding.

Q Now, we've been talking about a lot of e-mails and so forth that are on your computer and folders and things. And you mentioned that there's going be a new e-mail system at the ATSDR. And I'd like to state on the record that we want them preserved no matter what happens to the computer system. If you have to go home today and burn it onto a CD, every document that we've talked about during this deposition, we intend to request. He has been making a list of them. So I don't want to hear -- and I don't think the federal judge is going to want to hear -- that we had a change in e-mail systems and all of it got gone.

MR. BAIN: Well, we have to have, as we mentioned, a Rule 26 conference, a reasonable scope of request that you produce to us, which was agreed to in our joint status conference report. We still have not received that scope of preservation yet. We have taken steps through the agencies to preserve information that we believe is related. But until you identify what the scope is, you need to do that.

Also, I should say at this point, we did receive the notice of deposition for Mr. Maslia's deposition on Sunday, which should include an

attachment requesting certain documentation. We did not bring any documentation with us in response to that today, other than the report on Tarawa Terrace which Mr. Maslia has brought, because, for one, it was produced on Sunday which was not a reasonable time to comply with the request. Secondly, it was overbroad in that it requested basically everything that could, you know, under the sun, could be related to his work. And finally, it likely requested information that would be subject to privilege. So for that reason, we did not bring anything in response to that today.

MR. PANGIA: Well, that's fair enough. I just hope that the Justice Department doesn't play the same game that the Department of Navy has been playing with the ATSDR.

MR. ANDERSON: Why don't we take a break.

(A brief break was taken.)

BY MR. ANDERSON:

Q Based on the information available to you, what kind of an area is Tarawa Terrace? Is it mostly housing.

A It's mostly housing.

Q Is there shopping, swimming, bowling,

movies, other resources of entertainment there, to your knowledge?

A There's a shopping center. There's a school. I don't know about bowling specifically at Tarawa Terrace.

Q Is the movie theater over at Hadnot Point.

A Yeah. There's a movie theater and bowling at Hadnot Point.

Q And there's a shopping center at Hadnot Point.

A It's the exchange.

Q Yeah. So the answer is yes?

A Yes.

Q If a person was living at Tarawa Terrace and wanted to have access to those resources, they would obviously have to travel over to Hadnot Point if they wanted to go bowling without going off the base, for instance.

A That is correct.

Q And in the course of going over to Hadnot Point, a person who lived at Tarawa Terrace would have had exposure to the Hadnot Point water supply had they, say, for example, ordered a Coke at the Hadnot Point theatre or a drink from the supermarket water fountain.

A If they drank from the supermarket water fountain, yes, that would have been Hadnot Point water at that point.
Q Or if they swam in the Hadnot Point pool.
A Yes.
Q And those exposures obviously would be in addition to any exposure that they had at Tarawa Terrace.
A That is correct.
Q So you would have to add those exposure on top of the figures that is we saw in Exhibits 1 and 2.
A That is correct.
Q Now, I understand that these days you're working on a water model for Hadnot Point.
Is that right?
A Hadnot Point and Holcomb Boulevard.
Q Okay. And you've not finish that yet?
A No.
Q You started that some years ago, didn't you?
A We just recently this past year started the actual model. We've been in a -- putting databases together for the model since about 2007.
Q 2007. And what does that involve, putting data bases together? Gathering data?

A Again, it is going through disparate types of documents, pulling out pertinent data -- geohydrologic, hydraulic, water quality information -- and then putting -- conducting QA/QC on the data before you -- and then developing databases that are appropriate for the model that you're going to use.

Q Okay. And so you've been gathering the documents relating to the Hadnot Point, slash, Holcomb Boulevard water model since 2007.

A That is correct.

Q Were you provided all of the appropriate and necessary information for the Hadnot Point/Holcomb Boulevard water model in a timely fashion?

A We were provided documents when we specifically asked for a specific document type or -- a document type.

Q So if you knew something existed specifically and you were able to ask for it, you would get it?

A Yes.

Q But if you just asked for all documents relating to the water, that's where you would run into trouble.

A Again, we made that request several times,

and we still obtained additional documents after those requests.

Q Had supposedly been fulfilled.

A Say that again.

MR. BAIN: Objection to the form.

BY MR. ANDERSON:

Q And this is now having to do with the -- the next model at Hadnot Point/Holcomb Boulevard.

A Right.

Q So same thing again.

A Uh-huh.

Q Well, let me ask you this: Was the contents or even the existence of the underground storage tank, electronic portal disclosed to you when you began your study at Hadnot Point and Holcomb Boulevard?

A No.

Q Why not?

MR. BAIN: Objection; foundation, form.

THE WITNESS: I have no answer for that.

BY MR. ANDERSON:

Q Because you don't know.

A I can't answer. I mean, you'd have to ask the Marine Corps or the Navy.

Q You don't know why they weren't disclosed.

A No.
Q Did that impact your study?
A Yes.
Q How?
A Well, we had completed a review of what is referred to as the Installation Restoration Program sites, IRP sites, and that is described in an ATSDR-approved report. We call it Chapter C for Hadnot Point. And the data is very voluminous even for that, and so we were under the impression that we had all of the information that we needed to start preparing the databases for the model.
And when we started QA'g/QC'g our own report, we realized that had there were substantial documents, underground storage tank documents, that existed that we did not have possession of nor did we know the quantity or volume of those documents.
Q How did you make that discovery?
A During our QA/QC process -- approximately in January through March of 2009, we were QA/QC'g the Chapter C report. And in checking, for example, we made list of reference in the text. Okay. You want to make sure that you got that reference in the reference section. Okay. So it jives. We came across mention of these particular documents that we

had never seen before, okay, in reading that. And so our contractor sent a request, requesting a half a dozen of these documents.

Q Was that Bob Fay?

A That was Bob Fay. Bob Fay. And he asked me if he could just do it. And I say, Yeah, you don't need to go through me. Just go inform me of what you're doing. So he sent an e-mail request to the folks at -- actually, Scott Williams who was at headquarters. And he sent that request down to the environmental management division folks at Camp Lejeune. And, again, it's because we identified half a dozen, say, documents. They turned out to be UST documents that we mad mentioned or had reports on but we had never seen, the actual document.

And so they sent them, one or two. And then I see these e-mails going back and forth. Well, this document is too large to send by e-mail. Do you have an FTP site? Back and forth. And can you burn it on a CD? And it became apparent that the person Mr. Fay was in contact with was not excited about having to do document after document -- you know, send it by e-mail or figuring out a way to either hard -- print it off and mail it or whatever.

So she said, Why don't I just give you

access to a Web portal, okay, and you can download whatever you want. And that's the first -- and that was right around March of 2009. That's the first that we had heard of a Web portal specifically dedicated towards -- for underground storage tank documents and information.

Q Did you ever come to learn why you weren't told about those benzene documents until then?

A No.

Q The existence of leaking underground storage tanks, did that have, you know, an impact on your work in terms of your modeling the exposure assessment?

A Not on the -- at this point, not on the modeling. And we're talking about March 2009?

Q Uh-huh.

A At that point, not on the modeling work.

Q It was more the data collection.

A It forced us to now put Chapter C as only the installation restoration program sites and make another Chapter D of underground storage tank.

Q And did it ultimately add to the complexity of the model by virtue of the fate and transport characteristics of benzene?

A Would not add to the complexity of the

model. It would make the model take into account all information that's available.

Q Now, I understand that you concluded that approximately 1.2 million gallons of fuel is or may be missing, having leaked out of various tanks at Hadnot Point and Holcomb Boulevard.

Is that accurate?

A That is not our conclusion.

Q What is that based on? Whose conclusion is that?

MR. BAIN: If I can object at this point. And preliminary for purposes of whether it -- a certain privilege. Has there been a conclusion reached about that?

THE WITNESS: No. No conclusion has been reached.

MR. BAIN: So to the extent that you're asking him about a conclusion about that, I'm going to object and instruct him not to answer because it's a deliberative process.

MR. ANDERSON: Okay. I'm not sure I understand the basis for a claim of privilege. But let me just ask a few questions and try to trench around it a little bit and see if I need to worry about it.

BY MR. ANDERSON:

Q Are you telling me that you all are still studying how many gallons of fuel may be missing?

A Yes.

Q Okay. Is part of the reason why you don't know that yet, the fact that the Department of the Defense and the Marine Corps didn't tell you all about the new electronic portal until March of 2009?

A That is part of it.

Q When do you expect to have an answer to how much benzene was -- how much fuel and how much benzene got into the water for those folks?

A We are projecting or estimating at this point that our water modeling will be complete between December of 2011 and March 2012.

Q Well, when do you think you'll have an answer for how much fuel was lost?

A The same time.

Q Is benzene a known human carcinogen?

A Yes.

Q How does the fact of leaking underground storage tanks affect your exposure assessment? Does it affect it beyond what we have already talked about?

A You mean the data itself?

Q Well, just the fact that over at Hadnot Point and Holcomb Boulevard you now have a substantial quantity of benzene apparently that's going be found in the water, does that affect your assessment of people's exposure and their --

A That would be for the epidemiologist to address.

Q Is Camp Lejeune a Superfund site?

A Camp Lejeune is a Superfund site, an NPL site -- NPL site.

Q National Priority List?

A National Priority List site.

Q Is that the same thing as what people call Superfund?

A Yes.

Q And what does it mean exactly to be on the National Priority List?

A Well, EPA conducts an analysis to evaluate the hazard and looks at different pathways, and they've got some scoring mechanism. And then a site has to be proposed for inclusion on the NPL list or Superfund site. They announce it in the federal register, and then it's either put on or not put on.

Q It has to be bad enough to be put on it?

A It has to have a certain hazard ranking.

Q Is it true that CERCLA applies to those sites?
A To NPL sites?
Q Yeah.
A Yes.
Q And, to your knowledge, does CERCLA require that any documents regarding a release of contaminants at an NPL site be made public?
MR. BAIN: Objection; lack of foundation.
THE WITNESS: I'm not CERCLA expert, legal expert.
BY MR. ANDERSON:
Q You don't know the answer?
A I don't know.
Q Have the benzene documents on that electronic portal been released to the public?
A Be more specific, I guess.
Q Sure. You told me before that in March 2009 Bob Fay became aware of the existence of an underground storage tank, electronic portal, and that contained substantial documents previously not disclosed to the ATSDR in the course of its review.
Have those documents been made public?
A Not -- a substantial number of them have not -- a substantial number of them have not.

Q Why?
A Well, we were provided documents by the Navy or Marine Corps under what they call, for official use only, classification, which means we can use them as we warrant. But in order to release them, either as references in a report like this or to the public, we have to ask the Navy or Marine Corps to allow us to release them.
Q Have you asked to be allowed to release those documents?
A Yes, we have.
Q What was the response?
A The response was that they would have to assign somebody to review the documents and see what they needed to or not needed to redact and that they would get back to us.
Q Why would they want to redact stuff from the benzene-related documents?
MR. BAIN: Objection; lack of foundation.
THE WITNESS: I'm not a lawyer. That gets into the legal --
BY MR. ANDERSON:
Q You don't know?
A I don't know.
Q You don't know what part of it that they

want to hide?

MR. BAIN: Objection.

MR. ANDERSON: Well, that's what redacting is, isn't it? You block -- look at this one. Look at this. You block this out, right? Isn't that what it is?

MR. BAIN: Or following the law, the Privacy Act, et cetera.

MR. PANGIA: So nobody sees it.

BY MR. ANDERSON:

Q You don't know which part of it they want to redact.

A They have not indicated what they plan to or plan not to redact.

Q You just know it's going to take a while.

A They said -- they asked us back in January when we needed them by. We said August of 2010. And I sort of checked on that request a couple of months ago, and they said August 2010. So we are assuming that is what they are going to stick by.

Q So you told me before, you know, you can't -- you can't cite documents in your report until they have been made public.

So presumably until you get those documents redacted and given to you, you can't come out with

your report; is that fair?

A We can come out with the report. The issue is on scientific integrity. Anyone has the right to ask us for any of the reference material, and we need to be able to produce it so they can reproduce our analysis or whatever. And so if we can't use a reason, well, we're not allowed to release a certain document that from a scientific -- as I said -- integrity standpoint, that does not hold to the -- any, you know, water. No pun intended.

Q So, you know, your report -- your report can't come out until they review their documents and redact whatever they're going to redact.

A The Chapter D report, which is UST, and the model, the Chapter C report, which is the installation/restoration program sites, is, in fact, in the process of being published. That's using a different set of files that are public.

Q All right. But the other reports can't be published until --

A That is correct.

Q -- the documents are reviewed, redacted, and finally furnished.

Has anybody besides the ATSDR been asking for those documents to be released to the public?

A Yes.
Q Who?
A The community assistance panel. The CAP, the Camp Lejeune committee assistance panel.
Q And that's a group of citizens who are involved in the ongoing study of Lejeune?
A They are not involved in the study itself. They are a citizens group made up by former or past Marines. And they -- at times, we look to them to advise either -- or provide input to us, direction of the study or questions we may have specific to Lejeune. Since obviously the former Marines have been at Lejeune, they may have specific questions about that.
Q Are you aware of any senators demanding the release of those documents to the public?
A I'm aware of discussions with Senators Burr and Hagan. I'm not aware of a specific order or letter or -- that.
Q Just to clarify, are we to understand that as of now the ATSDR has some of the documents from that electronic portal that have not been made public?
A We have all of the documents listed in an index provided to us this year in March 2010, that

lists all of the documents, and we have all of the UST documents in that portal.

Q Okay. And can you describe for me the types and categories of documents that are on that list, that you're aware of.

A They are consulting reports assessing different points of contamination actually all over the base, not just what is relevant to us, in other words, of all of Camp Lejeune.

Q Including Tarawa Terrace?

A Yes.

Q Okay. Those are documents you were not -- obviously were not aware of at the time you completed your Tarawa Terrace model?

A No. Actually on the DVDs and in Chapter E, there are underground storage tank documents for Tarawa Terrace specifically; 30 or so, maybe, 50. And they're on the DVDs. At the time, though, we did not make the connection and we were not informed that they were taken from an underground storage tank portal. We just asked about underground storage tank documents.

We work on Tarawa Terrace specifically because of the benzene hits that we saw, and they provided us some of these documents. They were never

identified as coming from an underground storage tank Web portal or a possible --

Q And the index with all of the documents for that portal, that's something that you currently possess.

A Yes. We received that in March of 2010.

Q And looking through those benzene-related electronic portal documents yourself, is there anything that you see that seems to be missing from what you've gotten?

A We are still going through that because, as I said, that portal provides documents not just for Hadnot Point, Holcomb Boulevard, and Tarawa Terrace, but also other areas of the base like the air station, the rifle range, and all that. So we first have had to separate out those that are pertinent to our area.

Q So the answer is: At this point, we don't know whether anything is missing or not.

A We have a complete set for the portal.

Q Let me give you a for instance.

A Okay.

Q For example, you know, the contractor progress reports for the firm Environmental Science and Engineering?

A Right.
Q Did you notice that some of those are missing, that is, the progress reports from August '84 on? Have you found those?
A I'm really not aware of such things as progress reports. Again, we are still inventorying -- our contractor is still inventorying all of the documents. So --
Q You don't know what's missing?
A I don't know what -- other than the technical consulting-type reports, annual monitoring reports, things like that. When you get down to progress reports, I'm not specifically aware that, in fact, they were even part of that or that -- you know, how many there should be or should not be.
Q Yeah, there were monthly reports from a firm called Environmental Science and Engineering. And, you know, I'm aware that the report dated July 6th, 1984, states that the firm had sampled and was to test immediately thereafter Hadnot Point Well 602. And the August report, if you look at the earlier reports, the way it worked was, they sample one month and report the next.
The August 1984 result -- report would have shown the results of that Hadnot Point 602 test

which, you know, based on what you know as you sit here now, it would have shown benzene, right?

A Yes.

MR. BAIN: Objection.

BY MR. ANDERSON:

Q The answer was yes, wasn't it?

MR. BAIN: Same objection.

MR. ANDERSON: Did you get his answer?

Okay.

BY MR. ANDERSON:

Q And so, you know, I'm puzzled to learn that the August 1984 progress report and actually all of the subsequent progress reports from Environmental Science and Engineering are missing from the set. I just want -- my only question is: Have you noted that at this point?

A I personally have not noted that.

Q You're not aware. This is the first time you're hearing it.

A Yes.

Q All right. Fair enough.

Now, there were yearly summaries you mentioned a minute ago. There was one Camp Lejeune water CLW dock, 1406, which I'm now going to mark out of sequence as Exhibit 9 because I skipped a number

earlier and our good court reporter told me that.

(Plaintiff's Exhibit Number 9 was marked for identification.)

BY MR. ANDERSON:

Q This is CLW1406. It's Exhibit 9, and it's a yearly summary that showed benzene at 2500 parts per billion as of November 1985, on the second page there, CLW1407. Shouldn't there be data sheets associated with this document?

A Yes.

Q Okay. Have you found those?

A No.

Q And then I noted on the cover letter, it says that these enclosures indicate no immediate concern.

Did I read that correctly?

A That is correct.

Q And then it goes on to talk in paragraph 3 about the cost. It says: The cost of analysis of the sampling shown on these enclosures was approximately -- looks like 20 to 30 thousand. I can't read it -- funding by the Atlantic provision. Naval facilities engineering command of this analysis is anticipated to end not later than the end of this fiscal year. And, of course, we're in 1986 here.

NREAD has entered 120,000 in the 1988 POM to reflect the overall loss of funding for laboratory analysis.

And then in paragraph 4: It is apparent that careful planning will be required to absorb this additional cost and to hold actual sampling to the essential minimum.

Did I read that correctly?

A Yes.

Q And then it goes on to say in the next paragraph: Accordingly, the environmental engineers required to -- and then it's blanked out with a pen and redacted.

Have you seen an unredacted copy of this?

A Not this specific document.

Q I mean, do you know what it says underneath?

A No, I do not. I do not.

Q And at -- you know, at 2500 parts per billion of benzene human carcinogen, is that of concern to you?

MR. BAIN: Objection to form.

THE WITNESS: That would really -- again, a toxicologist would --

BY MR. ANDERSON:

Q Could convey about this.

A Yeah.

Q Go ahead.
A I was going to say, these are -- this is a CLW, but it's actually also a CERCLA document. We have no unredacted CERCLA documents. In other words, what they provided us is what we published.
Q And it's redacted.
A Okay.
Q So, again, your data is only what you get from the -- from the defendant at Department of the Navy and the Marine Corps.
A That's right.
Q I mean, you're relying on them.
A That is correct.
Q Right. We talked before about the 10,000-gallon underground storage tank that was near one of the Tarawa Terrace -- near the school over there. And I just -- I forgot to ask you at the time we were talking about it.

But when the children went to school at Tarawa Terrace, they drank the same water from that same Tarawa Terrace water system the whole time they were at school, right?
A That is correct.
Q So that water would have had the same contaminants that are listed in your reports?

A That is correct.
Q Did you see where the Department of the Navy or the Marine Corps took any step between 1980 and 1985 to make sure that the school kids received bottled water instead of continuing to drink the water that the Marine Corps was aware had these contaminants?
A Give the same answer I did that you asked before, of the only thing we note is the memo.
Q Claiming it was a trace amount.
A Of that. And no wells were shut down.
Q So the answer would be, no, you saw no bottled water brought into the school.
A Well, I have no knowledge of any mention of bottled water.
Q With regard to the Tarawa Terrace water system, water treatment system, have you ever heard of people claiming that there were pipes for that water system that used vinyl linings inside of asbestos pipes, linings that had been glued in with glue that had been thinned by PCE?
A No, I have not.
Q Did you ever investigate how the pipes were constructed?
A Do you mean the materials that the pipes are

made of?
Q Yes.
A Well, yes. We did that when we did the water distribution system model, and that's the water that distributes from the water treatment plant. Through the pipes, we classify the types by what types of materials. We need that information to assign certain properties in the -- for the distribution model. And they -- so we do have that information.
Q And, in fact, the pipes were not using vinyl linings, were they?
A The pipes were made from both cast iron and PBC.
Q Oh, so there was probably vinyl chloride piping in --
A The newer pipelines -- they replaced pipelines -- as they replaced older cast iron, they tend to replace them with -- sometimes with PBC.
Q Did you consider that as a potential source of additional contamination?
A No.
Q Did you consider the glue that would be used to glue those pipes together as a potential source?
A No.

Q Regarding the design of the Tarawa Terrace treatment plant itself, if you had a sample showing contaminated water coming out of the treatment plant, what would that tell you about the contamination?

A It would tell you that that's the same amount that anyone within Tarawa Terrace within a week would have received, because at Tarawa Terrace all of the wells are mixed and then it goes into the -- mixed in a raw water tank and then it goes into the treatment process.

So if you have a sample after the treatment process of a certain concentration, we, in fact, in Chapter I show the model results that after a week or so, the concentration stabilizes throughout the entire distribution system to equal the concentration at the water treatment plant.

Q So if the water coming out of that water treatment plant is contaminated, as you found, in order to figure out where the contamination was coming from, you would have to go back behind the water treatment plant to the individual wells for testing.

A That is correct.

Q Do you know why that wasn't done in 1980?

MR. BAIN: Objection; lack of foundation.

THE WITNESS: Be more specific.
BY MR. ANDERSON:
Q Was it done in 1980?
A At Camp Lejeune?
Q Yes.
A In 1980, throughout North American, people were not specifically testing for volatile organics anywhere.
Q After they were alerted to them.
A Oh, okay, okay.
Q And alerted that these things were in the finished water.
To know the source and know which well or wells was causing the contamination to be brought into the treatment plant, you would have, would you not, to test individual wells?
MR. BAIN: Objection; lack of foundation.
BY MR. ANDERSON:
Q Isn't that logical?
MR. BAIN: Objection.
THE WITNESS: You would have to ask the folks at Camp Lejeune because that would be part of the, say, environmental management division or order of quality branch.
BY MR. ANDERSON:

Q I would have to ask them why they didn't do certain things.
A Yes.
Q But in terms of knowing where that contamination was coming from, your model proves beyond any doubt that if we want to know, we have to look back of the treatment plant in the system because all of the wells go in there and mix together. We have to look at individual wells, don't we?
MR. BAIN: Objection to form; lack of foundation.
Go ahead.
THE WITNESS: I would say first that the model presents evidence within the reliability of the model, that certain wells were contaminated and that is what drove the contamination at the water treatment plant.
MR. ANDERSON: Okay. If we can just have a few minutes and maybe we can go off the record for a second.
(A brief break was taken.)
BY MR. ANDERSON:
Q Dr. Maslia, if there were another source of trichloroethylene beyond what you're aware of with

the ABC Dry Cleaners as a breakdown product of PCE of substantial quantities, is that something that you would want to know about?

A Yes.

Q Do you know of any other source -- have you been told about any other source of substantial quantities of trichloroethylene in the Hadnot Point/ Holcomb Boulevard area?

A In the Hadnot Point?

Q Yeah.

A Oh, okay. Because you said ABC Cleaners.

MR. BAIN: Are you talking about Tarawa Terrace?

BY MR. ANDERSON:

Q It's a different question now.

A Okay. Well, we know about sources of trichloroethylene at Hadnot Point.

Q What do you know?

A Well, there is an entire industrial area. And as with any industrial area, there's going be, you know, industrial solvents, TCE being one of them, PCE being another. They may, in fact, have used -- because there was an on-base dry cleaner near in the Hadnot Point area, they may have used both compounds, both industrially and in the dry cleaners too. So we

are aware of TCE at the Hadnot Point. And there's obviously a source or sources for that, and that's what we -- we'll be relying on the model to help refine that understanding.

Q Are you aware of disposal of contaminated used -- trichloroethylene solvents in the Hadnot Point area?

A Yes. There is a landfill there as well, and they used disposable practices at the time to dispose of, you know, industrial waste and stuff like that.

Q What disposable practices are you aware of with respect to the solvents at Hadnot Point?

A Well, all I know in a general sense is that that landfill was used to dispose of, you know, solvents and things of that nature.

Q Are you talking about the volatile organic compounds?

A Yes.

Q And you talking about pouring drums of used trichloroethylene solvents into a hole in the ground? What are you talking about?

A It could be just -- because there's a -- in that area, they, you know, repair vehicles and all of that and all of the military equipment. So it could be just waste from that, and they needed to dispose

of it. How they disposed of it, we don't know. It's a complexity of challenge, unlike the Tarawa Terrace -- or the ABC Dry Cleaners where we know there was like a sledge pit and that's where they put it in there. We don't have specific documentation as to the actual practice of, you know, from point A to point B to point C of what they did with the -- with the waste product.

Q So as far as Hadnot Point goes, as you sit here today, you don't know anything about a sledge pit for TCE waste.

A No.

Q And have you asked for documents that would have revealed the existence of that -- such a pit?

A We have asked for all documents related to Hadnot Point/Holcomb Boulevard and to assist us to reconstruct historical concentrations.

Q Have you been advised, as you sit here today, about efforts to spray the used trichloroethylene waste into the trees along the edge of the base?

A I have not heard that previously.

Q How about burning of the trichloroethylene sledge waste?

A There are some burn pits that I'm aware of,

just in the documents.
Q You have seen documents that confirm the presence of those burn pits, haven't you?
A Yes.
Q Have you seen documents that confirm the burning of trichloroethylene waste?
A Not myself personally, I have not.
Q Have people described to you such documents?
A Former -- not documents. They have described activities. Members of the camp have.
Q Okay. And how do you know about that?
A Well, just in general discussions. As we were formulating our approach to Hadnot Point and what areas we should or should not consider, we had selected three areas to look at in our water model for the Hadnot Point/Holcomb Boulevard area. And there are multiple contamination sites in those general areas. And we had to limit our analyses both because of time and funding and to try to get the epidemiological study concluded. So we limited it to three major areas that we felt would address the epidemiological study and the historical exposures.
Q What three areas?
A The Hadnot Point industrial area, HPIA; the Hadnot Point landfill; and then what we were

referring to as the HP645 area, which is actually at Holcomb Boulevard. It's Building 645, associated with Water Supply Well 645.

Q Why there?

A Benzene.

Q You said you were aware of burning of -- I think you said you were aware of burning of trichloroethylene sledge from people at the camp, in conversations or something.

A No. I was just aware that they used a, quote, burn pit to dispose of waste products. I don't have -- I have not read specific documents, and I have no specific knowledge of specific practices.

Q Have you seen the burn pits?

A I have not, no.

Q The funding for the ATSDR studies -- who controls what funding you guys get for what studies?

A We put in a request along with our Division of Health studies because we are basically technical consultants. My division is. And so they put in how much total money the agency needs. And then we put that in each years what we call annual plan of work, the APOW. Okay? It's what it's called. And we list what we are going to do in general terms.

You know, we've got a water modeling

component. We've got a health study component. And that's what we request from the Department of -- now it's the Department of Navy. At one point, it was the Marine Corps. It switches back and forth.

Q So you -- what you get to study and how much money you get to study is actually controlled by the Department of the Navy?

A Not necessarily what we get to get. But they either approve our budget or don't approve our budget. But, yes, we have to ask -- the money comes through the Department of Navy.

Q Are your analyses of any of the Holcomb Boulevard and Hadnot Point areas that you have told me you're studying -- is any part of that work now complete, complete enough to tell me about?

A No, no. Not -- it's in draft or -- I forget the exact label or term for it. But it's -- what I would consider in draft form, has not gone through any kind of review.

Q Peer review?

A Peer review, agency policy clearance review, or anything like that.

Q All right. Do you anticipate that you will personally look through the documents that we discussed today about Hadnot Point/Holcomb Boulevard

are, for instance, documents having do with burning TCE and all that kind of thing?

A Now that you mentioned it, I will look at them.

Q And the documents relating to pouring it into the ground, will you look at those too?

A It's really a generalized term only because -- I say that because, again, we did not -- we do not have specific documentation of their operational practices, in other words. So it's hard to ask for information or go in and search and say, you know, pour in TCE into the ground.

You're not going to find -- even with the documents we have, it's more of a discovery process of reading documents and saying -- or if it's brought to our attention -- I say former Marine -- that this is what happened, then we may try to find a document that supports that type of operation.

Q If you searched for TCE and pit, can you run a search like that?

A We can run a search on the available CERCLA administrative record documents that's on the DVD in Chapter A.

Q Okay. You mentioned that if a Marine told you that they were disposing of this by pouring it in

sledge pits, then you could go and look for documentation to support that report.

What have you done to interview about that issue?

A About the sledge pit?

Q Yeah.

A I'd really have to ask my other staff if they've had conversations with the -- with the former Marines, only because we're not at the stage of looking at the transport of contaminants at Hadnot Point. We are still working on the actual -- just a groundwater flow model part.

Q I understand.

A And when we get to that part, it would be important to identify how and when sources originate, because we have to tell the model where the source is or the frequency of the source to do that. So we're not at that point yet.

Q But you will get there, and that information would be important.

A That information would be important.

MR. ANDERSON: Okay. Anything else?

MR. BAIN: I just have a few questions of you, Mr. Maslia.

EXAMINATION

BY MR. BAIN:

Q First of all, counsel gave you this notice to the residents of Tarawa Terrace, which is Exhibit Number 8, and asked you about the description in here. I think the word that was used was minute quantities of the contaminants.

Do you remember that?

A Yes. I remember that conversation.

Q And counsel asked you whether that was correct or not. And I believe you said it was not correct based upon the maximum contaminant levels for those contaminants. Is that right?

MR. ANDERSON: Object to form.

THE WITNESS: Yeah. I think we used the word "trace amounts," and I said I would not consider that a trace amount.

BY MR. BAIN:

Q And that was based upon what the maximum contaminant levels were for those chemicals; is that right?

MR. ANDERSON: Object to form.

BY MR. BAIN:

Q That was the basis for your answer?

A Yes.

Q And as of the date of this particular

document, 1985, had a maximum contaminant level been establish for either trichloroethylene or tetrachlorethylene?

A No.

Q Okay. Another subject that I want to ask you about was, there was a lot of discussion about the documents that had been provided you by the Marine Corps and the Department of the Navy.

Have there ever been any situations where you were aware of a particular document or a set of documents and requested it from the Navy or the Marine Corps and they refused to provide it to you?

A No. They have never refused to provide us documents that we have specifically requested.

Q And finally, counsel just asked you about documentation of past practices with respect to the Hadnot Point industrial area, of that area.

And you're aware, aren't you, that that area has been studied as part of the CERCLA process; is that right?

A That's correct.

Q And that would include a review of documentation and, if necessary, interviews with people?

A Right, yes.

Q And that is something that you would rely upon in looking into that question for the purposes of your model at the Hadnot Point area?

A Yes. It would be in, say, remedial investigation reports and/or feasibility studies, that they typically would go back through historically and describe what practices may have occurred or did not occur and document that.

Q Those documents which were produced as part of the CERCLA process or, as the military called it, the installation/restoration program, those are made part of the administrative record; is that right?

A That is correct.

Q And as you mentioned previously, that record is publicly available.

A Yes.

MR. BAIN: Okay. That's all of the questions that I have.

MR. ANDERSON: I just have one or two more last questions.

FURTHER EXAMINATION

BY MR. ANDERSON:

Q Would you consider the amounts that were reported in the Grainger report to be a trace?

A The concentrations of -- I just look at this

letter again just to make sure we are -- the ones where you have an indication of less than one or one would be considered trace amounts.

Q And the others?

A And the others would not be considered trace amounts.

Q And what was the date of the Grainger document?

A The date is August 10th, 1982.

Q And what was the date of the memo saying it was a trace?

A April 1985. I can't read the exact date on here.

MR. ANDERSON: Thank you. That's it.

MR. BAIN: The last thing I would like to -- you have an opportunity read and sign the deposition, and I would request that you do that.

THE WITNESS: What?

MR. BAIN: Read the deposition and sign it.

THE WITNESS: Oh, sure.

(Deposition concluded at 1:50 p.m.)

* * *

C E R T I F I C A T E

I hereby certify that the foregoing transcript was reported, as stated in the caption; that the witness was duly sworn and elected to reserve signature in this matter; that the colloquies, questions and answers were reduced to typewriting under my direction; and that the foregoing pages 1 through 186 represent a true, correct and complete record of the evidence given.

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_____

AMY L. DUNNING, B-2079

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MORRIS L. MASLIA, P.E., D.WRE, DEE

Sworn to and subscribed before me,
_____, Notary Public.
This _____ day of _____, 2010.
My Commission Expires:_____.